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No. 12
VOL. XXVI

75 E. Wacker Drive
Chicago, U. S. A.

ity has been developed until the dairy cow pro-
es many times the quantity of milk given by
cow in a state of nature. This has thrown a
nendous stress upon the entire animal, and, as
nsequence, the udder may not stand the strain.
he anatomical situation of the udder exposes
o cold, bruises, wounds and filth. The paren-
matous tissue of this organ is extremely sus-
e to these influences. The udder is weakened,
resistance toward infection reduced, and a
ile field prepared for the organisms that pro-
e mastitis.
ecently secreted milk possesses some bacteri
il power. At the end of 4 to 8 hours this is lost.
milk then becomes a suitable medium for the
wth of pathogenic organisms. The primitive
was suckled by the calf at frequent intervals
the milk was removed almost as soon as se-
ed. The dairy cow is rarely milked oftener
n twice a day. The udder becomes gorged with
k, which has lost its bactericidal ability, the
ulation suffers due to pressure, and any bac-
a finds conditions suit-
for rapid multiplica-

he dairy cow is highly
and pushed for produc-
The digestive system
overworked, and the or-
s of elimination strained.
addition to this, the
on fed may not possess
the elements necessary,
as a result, the animal's
stance toward disease is
reased to the danger
nt. In cows kept under
e conditions mastitis is
cially dangerous.
he symptoms of mastitis
so well known that they
uire little discussion. It
ustomary to divide mas-
into catarrhal, paren-
matous and interstitial
ns, according to what
e of tissue is affected.
wever useful this may be
nologically, few cases can be so differentiated
ically. The intimate relation between these
ues makes it difficult for one to be affected
nout the other also becoming involved. The
ptoms may also vary according to the organ-
s responsible. Some produce a mild type with
e systemic reaction, while others cause a per-
te condition in which the vital forces of the
nal are overwhelmed and death occurs in a
hours.
is an axiom of therapeutics that the more
hods that are proposed in treating a disease,
less successful any of these methods are. A
tal review of the literature will show that a
nendous variety of drugs and agents have been
mmended at various times for mastitis. They
e upon the horizon, have their day, and then
ppear.
uccessful treatment must be applied to the
where the actual disease process is located.
mpts to do this in mastitis have included the
ction directly into the udder of various anti-
septic fluids and even gases and vapors. Solut
of boric acid, ether vapor, and oxygen gas
been advocated in the past, but at present th
jection of any substance into the udder is not
sidered good practice. Little if any good was
complished by these methods and many
more damage was done due to irritation of
udder tissue and possible introduction of
tional infection. The alveoli with their tub
are soon blocked by the products of inflamma
and the drugs could not come in contact with
tissues where the causative organisms were
cated.
Many drugs given per orem or intravenously
eliminated with the milk of the normal ud
Attempts have been made to take advantag
this by giving drugs with an antiseptic action,
ing that they would exercise their bacteric
action in the udder. Again we find that in
titis the blood supply to the affected region
the udder is soon interfered with by swelling
pressure and thrombus formation in the s
blood vessels so that
many cases this metho
medication is ineffec
especially is this true
mastitis has existed for
eral hours. To obtain
cessful result the treatm
must be initiated at the
onset of the disease.
The use of biologics ra
several questions. Many
cies and strains of or
isms have been incrimin
in mastitis and until
know which are the
acting in any particular
we are shooting in the d
The use of autogenous
herd bacterins seems n
logical than those prep
from stock cultures.
It is well to remember
many cases of mastitis
of such a virulent type
no known treatment is
fective. The quarter
quarters of the udder are ruined and even
occurs in a short space of time. This is especi
true in those cases that occur soon after part
tion. The prognosis here is distinctly unfavor
and the owner should be acquainted with thi
once.
Dairymen should be trained to seek veteri
assistance at first sign of mastitis. This ma
a flakiness of the milk, swelling or tenderne
the udder, suppression of the milk flow, or
a chill or loss of appetite. The cow should at o
be isolated from the other cattle, and a hot p
placed upon the udder. This pack should be
padded with cotton or other similar material u
it is thick enough to retain the heat. Water
temperature of about 120 degrees should be
manually applied for hours. Unless this can
done faithfully and efficiently its value is
Some one should be placed on this job and k
there. If the udder is allowed to become col
chilled more harm than good is done.
Instead of hot water, a pack of Antiphlogis

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—D. E. Baughman, President
Fort Dodge Serum Company

Veterinary Medicine

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor

Lovell isolated a bacillus belonging to the Salmonella group from aborting sheep both in England and in Germany. He calls it *Bact. abortus ovis.*

Dreyer and Vollum found that BCG may at times develop a relatively high degree of virulence for laboratory animals under certain simple cultural conditions.

Schumann and Lerche, in a series of experiments on cows, confirmed the current opinion that pregnant cows should not be given live culture abortion vaccine.

Traum and Henry conclude, as a result of experimentation, that 1% boric acid is a safe and efficient preservative for milk intended for examination for *Br. abortus* by guinea pig inoculation.

Schalk found that less than 1% of the eggs of tuberculous fowls are infected with the tubercle bacillus and presumably infected eggs seldom hatch, since avian tuberculosis is not transmitted to the embryo through the egg.

Lignièrs found that by the addition of egg to the medium some cultures of BCG can be exalted in virulence to the point of producing progressive tuberculosis lesions in guinea pigs. He thinks that the Lübeck tragedy may have been due to the use of BCG vaccine grown on media containing egg.

Blanc found 17 out of 100 dogs examined in Athens, infested with *Taenia echinococcus*

Schermer found the blood serum of cows affected with osteomalacia had a very low phosphorus content, but that the calcium was not markedly low.

Shillinger states that at least half the ration of silver foxes should consist of meat or other animal products and that it should include bone meal to provide the necessary calcium and phosphorus.

Mangiarotti was able to cure anti-partum paralysis of cows by the injection of one dram of a 1:1000 adrenalin solution into each quarter of the udder. The treatment was effective even in a stubborn case where the animal had twice gone down after inflation of the udder. The author attributes the effectiveness of the treatment to a reduction of the blood flow to the udder.

Beaudette of the New Jersey Agricultural Experiment Station in 10,000 autopsies of chickens, found 2,281 cases of pullorum disease; 300 cases of fowl cholera; 53 cases of tuberculosis; 137 cases of roup; 2,094 cases of parasitic diseases; 1,078 cases of disease due to filtrable virus; and 561 due to dietary deficiencies. There were many cases in which death was due to swallowing nails which had lodged usually, in the gizzard.

Hall found that santonin is more effective against ascarids in repeated small doses than it is when a single large dose is given. The small doses should be given daily for a period of four days to a week.

Schermer concludes as a result of considerable investigation, that the presence of correctly balanced phosphorus and calcium in the diet are not sufficient to prevent osteomalacia in cattle. It is essential that vitamin D be present in the ration.

Schermer found that cows affected with osteomalacia showed great improvement at once and were cured in a short time even when there was no proper change in diet (silage) when given irradiated ergosterin. When Lucerne hay was fed (two pounds per day) the recovery was even more rapid.

Traum and Hart found that tubercle bacillus survived in milk preserved with 1% boric acid and that such milk can be sent a considerable distance even during warm weather without becoming contaminated to such an extent as to interfere with laboratory examination or the results of inoculation into guinea pigs.

Birch of the University of Illinois was able to control hemophilia in seven cases in man by the use of ovarian extract (human). Theorizing that since females are not susceptible to hemophilia they must possess some protective hormone not possessed by the male, an attempt to control the condition was made with ovarian extract and a single injection stopped the bleeding for a period of 12 months.

Lamb dysentery according to W. Tyle Stewart, is due to a bacillus that is similar though not identical to the *B. welchii.* The disease is manifested by a bloody diarrhea and is characterized by ulcers in the small and large intestines. The disease can be controlled by the use of a a serum (prepared from horses) injected into the ewe before lambing or into the 10 to 12-hour old lamb. —*Bio. abstract* 17392.

Ross administered copper sulphate (1:5000) daily in the drinking water of sheep over a period of six months. No beneficial effects in the control of stomach worms in these animals were observed.

Becker found sulphur dioxide gas as effective in the treatment of mange in cattle as the ordinary dips. The gas treatment, however, was more expensive, far more laborious and possessed greater elements of danger than dipping.

Avian tuberculosis is of little or no importance as a public health problem in the United States; nor is it of material economic importance to the poultry industry where good methods of poultry culture are employed; that is, where the birds are disposed of at one year of age, or less. Its principal importance is to the swine industry where it causes great losses.

Hall states that purgation prior to anthelmintic medication is not invariably required. It is necessary in tapeworm infestations in order to clear away the mucus. Chenopodium and castor oil can be combined without reducing the effectiveness of either. Castor oil reduces the efficacy of carbon tetrachloride. When purgatives are given after an anthelmintic, a rapidly acting saline is generally preferable. It should not be given in concentrated solution.

From voluminous experiments which have been carried on over a period of many years and which have involved thousands of rats, guinea pigs, rabbits, pigeons and monkeys, Col. Robert McCarrison, world-famed English student of nutrition, concludes that one-sided diets, disproportionately rich in cereals and poor in animal fats, milk and fresh vegetables, are responsible for many of the ailments to which man is supposed to be heir. By maintaining albino rats under first class hygienic conditions and feeding them on a well-balanced diet he found that there was no infant mortality and no deaths among adults from natural causes.

The "age of mammals" is estimated to have commenced about sixty million years ago.—*Science.*

Dogs are zoologically first cousins to foxes, bears and raccoons and practically blood brothers to wolves.—*Science.*

Dental caries was entirely controlled by selection of the diet in an experiment conducted by Bunting of the University of Michigan.

Feline Tuberculosis is frequently manifested by a deformation of the face, induced by involvement of the facial skin. There may or may not be fistulous tracts and ulceration of the affected skin.— *Bio. abstract* 17352.

Paratyphoid infection is not rare in fur bearing animals, according to Meyn, who reported finding *B. enteriditis* in nine silver foxes, one otter and three coypu. The source of infection was not determined.—*Bio. abstract* 17371.

A bath in sodium thiosulphate eliminated ringworm of the feet (athletic foot, toe scald, Shanghai foot, etc.) at the Albany Junior High School. Half the pupils were infected and various treatments had been used previously without success.—*Science.*

According to Duval the hog cholera virus content of blood serum varies with the size and age of the hog, and with the duration and severity of the infection. Usually 1cc of cell free virus serum contains approximately 4,000 fatal doses for pigs weighing 40 to 50 pounds.—*Bio. abstract* 17684.

Ostriches of the Syrian desert are able to run for a period of two hours at a speed of 70 miles an hour, according to Prof. Aharoni of the Hebrew University, Jerusalem. They can not be followed closely by an automobile because the stones they kick up break the windshield and endanger the occupants.

Tuberculous meat and milk containing tubercle bacilli was found to be the source of tuberculosis in five silver foxes, one otter and one coypu. Each of these fur bearing animals was autopsied and tubercular lesions demonstrated.—*Bio. abstract* 17359.

Salmonella infection in cattle has been reported by Montenegro in Sao Paulo. Of the 22 cattle that died of this infection over 80 per cent evidenced necrotic lesions in the form of organized nodules in the liver. In one case pulmonary infarcts were numerous and in another there was chronic interstitial nephritis.—*Bio. abst.* 17375.

Nephritis is a relatively common condition in domestic animals particularly in dogs and swine. Acute interstitial nephritis probably of bacterial origin has been observed in dogs. Parenchymatous nephritis, catarrhal in character in which the cortical tubular epithelium is involved in not infrequently associated with infectious diseases and is probably of toxic origin. Streptococci are most common cause of glomerular nephritis in animals although glomerular nephritis has been observed in arsenical poisoning.—*Bio. abstract* 17370.

Absolute zero is 459 degrees below zero Fahrenheit; the lowest temperature so far attained artificially is — 457.4° F.; the lowest natural temperature observed — 90° F. in northern Siberia. Solidified carbon dioxide gas (dry ice) the coldest substance in every day use has a temperature (melting) of — 112° F. Liquid air which is manufactured on a large scale industrially for the preparation of oxygen, boils at — 296° F. The highest climatic temperatures recorded are 136° F. in Tripoli and 134° F. in Death Valley, California. The highest artificial temperature so far attained is 45,000° F. produced by passing an electric current through tungsten. It caused an explosion producing a light 100 times as bright as sunlight. The outer layer of the sun is computed to have a temperature of 11,000° F. Some of the stars reach a temperature of 72,000,000° F. Iron melts at 2,745° F.

Bovine Red Water—Cystic Hematuria

By J. W. KALKUS, Puyallup, Washington
Superintendent Western Washington Experiment Station

THERE is prevalent in the Pacific Northwest a disease affecting cattle which because its most prominent symptom is the passage of bloody urine, is commonly referred to as red water. The disease is confined largely to the coastal region of British Columbia, Washington and Oregon but occasional cases have been seen in certain localities east of the Cascade Mountains in Washington and in the Panhandle region of Idaho. In so far as can be determined, the disease has existed here to a greater or less degree ever since the first introduction of cattle by the white man. It has never been reported as affecting any other than the bovine species. Cattle of both sexes and all ages may be affected. It is, however, most commonly seen in cows and is seldom recognized until after the first calving.

Due to its characteristic symptoms and lesions, the disease is also known by numerous other names, such as bloody urine, red urine, smoky urine, hematuria, enzootic hematuria, cystic hemangiomatosis and cystic hematuria. It is a specific disease of cattle and is characterized clinically by the constant or periodic discharge of bloody urine and its chronic course, and pathologically by the characteristic vascular lesions which occur on the bladder mucosa. It is further characterized by the fact that its course is non-febrile, which serves at once to differentiate it from the numerous so-called red water diseases of infectious origin which are always accompanied by high fever, chief among which are Texas or tick fever, anthrax, and the red water disease of cattle known as bacillary hemaglobinuria, studied and reported by Records and Vawter of the Nevada Station.

So far as is known, the red water under discussion does not occur in any part of the North American Continent except in the Pacific Northwest. A similar or identical disease, however, has been reported from other parts of the world. Moussu[1] reports its occurrence in France. Clelland[2] discusses the occurrence of endemic hematuria due to angiomata in the bladder of cattle. He says it is common in the coastal district of New South Wales, Australia. He also calls attention to the fact that evidently the same disease existed near Mount Gambier in South Australia in 1894. Occasional cases occur, too, he says, in Victoria and probably it is the same disease that exists in Fiji and other islands in the Pacific Ocean. Case[3] reports red water of a similar character occurring in the Pacific Islands. In 1913 Hadwen[4], during a trip to Europe, personally examined numerous cattle in the center of France and satisfied himself that they were suffering from red water which was in all respects identical to the red water which is so common in the Pacific Northwest.

In addition to these authentic reports, conversation with natives of Sweden and Norway indicate quite conclusively that cystic hematuria, identical with our red water, is quite prevalent in many parts of the Scandinavian peninsula.

Etiology

Many different investigators have devoted a great deal of time to the study of red water but no one has yet been able to determine, by carefully controlled experiments, just what is the specific cause. Bowhill[5] after making a study of the disease in British Columbia and parts of western Washington while in the employ of the Canadian Government, came to the conclusion that the disease is due to the prevalence of haemocytozoa. He claims to have actually

1. Moussu, G—1911, Traite des Maladies du Betail, 3rd Edition.
2. Cleland, J. Burton—Endemic Haematuria in Cattle, *Jour. of Tropical Vet. Sci.*, Vol. VI No. 2.
3. Case, Leonard N.—1911, Red Water in Cattle, Report of Division of Animal Industry, Hawaii, pp. 199-204.
4. Hadwen, S.—A Study of Haematuria in France and Other Countries, Report of Vet. Div. Gen. of Canada for the year ending Mar. 31, 1914, p. 119.
5. Bowhill, Thomas,—Red Water Investigations in British Columbia, Rep. of the Vet. Div. Gen. of Canada for the year ending Mar. 31, 1909, p. 101.

transmitted the disease from sick to healthy cows both through the inoculation of fresh blood and through the medium of ticks. He refers to blood parasites as flagellates and trypanoplasma as being present in the blood of both natural and inoculated cases. Subsequently Hadwen,[6] who succeeded Bowhill and investigated the disease in the same localities, proved quite definitely that the latter was an error. Clelland[2] in his investigation of the disease in New South Wales suggests the possibility of the condition being caused by pentastomes. This investigator points out that in four cows suffering from advanced red water living larval pentastomes were easily found in the messenteric lymph glands, and in addition there were in some cases very numerous calcified remains of dead ones. This observer goes on to state, however, that he has found pentastomes in cattle of districts unaffected with hematuria, but he thinks that the parasites are more numerous in red water cases.

During the past twenty years, the author has, from time to time, had opportunity to study red water in the Pacific Northwest. Hundreds of natural cases have been observed in the field, almost fifty cases have been carefully autopsied, and many experiments have been conducted in an effort to determine the cause of this condition. A preliminary report was published[7] in 1913. As a result of these investigations, the author has concluded that in all probability both infection and parasitism may be eliminated as a possible factor in the cause of red water. The fact that fever is absent in affected animals, that as a rule only a comparatively small percentage of a herd contracts the disease, that the disease is restricted to certain sections of the country, and the further fact that cows affected with red water are incapable of transmitting the disease to healthy animals in areas where the disease is not known tends to indicate that infection may be eliminated as a possible cause. It is doubtful too, that parasitism could in any way have a relationship to the cause of red water since, in all autopsies, careful examinations have consistently failed to reveal the presence of any parasites or their eggs which might be considered as possible etiological factors. On the other hand, the fact that the disease occurs in comparatively restricted areas, that in these so-called red water districts it is confined largely to bench land, hills or upland, that it is apparently a disease associated largely with backward agriculture, and that it apparently disappears as land is put under cultivation and properly fertilized, has given rise to the theory that it is a forage problem. For many years it has been the belief of livestock men living in red water districts that numerous plants when consumed by cattle are the cause of this disease.

After an investigation of the disease in British Columbia and observations of numerous cases of red water in the center of France, Hadwen came to the conclusion that the disease might be due to the presence of oxalic acid in numerous plants growing on acid soils in red water districts. Hadwen's opinion was that cattle consuming a large amount of oxalic acid-containing plants would have a sufficient amount of calcium oxalate crystals accumulating in the bladder to cause irritation and thus cause the development of the characteristic vascular lesion on the mucosa of the bladder. To substantiate his theory, Hadwen conducted numerous experiments with healthy cows and was able to prove to his own satisfaction that the oxalic acid theory is substantially correct. The experiments consisted of injecting directly into the bladder quantities of calcium oxalate and also the feeding of oxalic acid in small doses over a long period of time.

In the past few years an attempt has been made at the Western Washington Experiment Station to duplicate Hadwen's results in producing artificial cases of red water by the feeding of oxalic acid in 30-

6. Hadwen, S.—Report of the Vet. Div. Gen. of Canada for the year ending Mar. 31, 1910. Appendix No. 9, p. 57.

7. Kalkus, J. W.—A Preliminary Report on the Investigations of Bovine Red Water (Cystic Hematuria) in Washington. Bul. No. 112, Oct. 1913, State College of Wash. Agricultural Experiment Station.

gram daily doses over a long period of time to heifers.[8]

In our experiments, one heifer was fed a total of 2,910 grams of oxalic acid in 852 doses during a period of almost 2½ years from April 10, 1924, to August 16, 1926. She died following difficult parturition and autopsy revealed no changes whatever in the bladder mucosa. Two other heifers, each of which had received a total of over 30,000 grams of oxalic acid over a period of more than three years, also failed to develop any indication of hematuria. Similar experiments have been conducted for the past two years in the feeding of calcium oxalate with similar results.[9]

Symptoms

Under ordinary circumstances, the first noticeable symptom is the passage of bloody urine. In some cases affected cows may show frequent urination several days in advance of the appearance of bloody urine. The act is accompanied with some straining and much switching of the tail and the urine is scanty. When the urine becomes bloody it may either be uniformly red in color or the greater portion may be passed clear, with just a tinge of red as the act of micturition terminates. Further than this no other symptoms are noticed; the animal seems in perfect health, the appetite is good, the temperature, pulse and respiration are normal and the milk flow unaltered.

In a heifer having her first calf these symptoms come on after parturition, but in a milk cow they may become manifest before calving. The writer has never observed red water in a heifer before calving nor in a sterile cow.

This first attack may last only a few days or again it may continue for weeks or months. If it lasts only a few days, the urine clears up and the condition is frequently attributed (by the owner) to any one of a number of simple causes, such as injury during parturition, a fall or a kick or some form of forage. If the condition continues for a longer period of time, the urine remains bloody, varying in color from light to deep red, resembling at times pure blood and even containing clots. This color, of course, depends upon the severity of the hemorrhage within the bladder.

The urine, probably because of the salts it contains, prevents to a marked extent the clotting of blood. To what extent this property is manifested in the living animal has not been determined. Samples of urine taken from the red water cows in which no clots were present have shown as high as 10% corpuscles on centrifuging.

In experiments outside of the body with normal cows' urine and blood, this property of non-coagulation has not run as high as would be indicated from samples of red water urine. In a number of experiments, where normal fresh cow blood was mixed with normal urine, clotting has always taken place in dilutions of over five per cent blood. This property of clotting probably depends upon the amount and variety of salts in the urine, the state of anemia of the subject and probably to some extent upon the rapidity of the outflow of blood.

A cow affected with red water and in the last stages of the disease, in which the corpuscular count would be very low, would probably have more fluid blood in the urine than a cow that has recently contracted the disease. On the other hand, a recent case of hematuria might pass clots of blood; but this would not necessarily mean that the case was an exceptionally severe one. Many cases have been known to pass clotted blood in the urine, apparently recover and live for months or even years after the attack.

After the first attack, whether it be of short or of long duration, the urine again becomes clear and remains so for varying periods of time. Even though urine appears clear to the unaided eye, we have never failed to find red blood cells in it by microscopic examination.

This is the time, i.e., when the urine clears up, when the unscrupulous owner, knowing that the animal will again show the symptoms at a future period, seeks to dis-

8. Annual Reports, State College of Washington, Agri. Exp. Station, Buls. No. 208, p. 43; No. 222, p. 52; No. 229, p. 44; No. 237, p. 45.

9. Annual Report of the Western Washington Exp. Station for the year ending March 31, 1930, p. 41.

pose of his animal to an unsuspecting neighbor. Where such a procedure is suspected it is only necessary to pass a soft rubber catheter which always tells the tale.

The periods of subsidence vary greatly in different individuals. Some animals pass bloody urine at irregular intervals of several days, some every few weeks and some have an attack every few months, the attack usually lasting several days.

The more common case is one in which the symptoms subside completely after the first attack and do not again appear until just before or after the next parturition, an act which seems always to increase the severity of the disease. At this period the attack is usually more severe, lasting a longer time, the hemorrhage becomes greater and other symptoms of a graver nature develop.

The patient begins to emaciate, the milk flow decreases and with the constantly increasing hemorrhage the cow becomes quite weak. The small tuft of hair at the inferior commissure of the vulva as well as the tail and posterior extremities become soiled with blood. The hemorrhage may be so great as to cause large clots to form in the bladder, thus obstructing the urethra. In such a case the bladder sometimes becomes distended and its walls paralyzed; the fluid contents gradually overflow and there is a dribbling from the urethra. The appetite is always good, in fact voracious; the animal eating anything within reach; at times the appetite is much perverted and there is a tendency to eat barnyard manure and especially earth, probably to satisfy a craving for salts, which are lost with the extravasated blood. The thirst is always excessive because of the great loss of fluids from the body. In advanced cases the visible mucous membranes are always anemic.

A rise in temperature above normal has never been noted in a case of red water, but frequently there has been a fall of two to four degrees Fahrenheit a short time prior to death. As the disease progresses the periodic attacks become more frequent and prolonged; the drain upon the system is enormous; the hematopoietic organs are unable to regenerate blood rapidly enough to replace that which has been lost and death ensues as a result.

Blood Changes.—During the early stages of hematuria there is but little change in the blood. The hemorrhage at this time is but slight and the blood forming organs can readily replace the corpuscles that have been lost. As the disease advances and the hemorrhage becomes more pronounced, there is a gradual diminution of the number of red cells and usually a corresponding decrease in leucocytes. The hemoglobin content is also diminished, but does not necessarily correspond with the decrease in erythrocytes.

In the later stages of the disease, when the hemorrhage is continual and severe, the erythrocytes sometimes diminish to less than one million per cu. mm. of blood and the corpuscles resemble very much those found in true pernicious anemia. Examination of stained smears reveal the presence of a few normoblasts, many stippled cells, microcytes, macrocytes and poikilocytes.

Urine.—The urine always shows an admixture of blood. As previously stated, although the urine may appear clear to the unaided eye, microscopical examination after sedimentation has always revealed the presence of red cells. The color of the urine then varies with the severity of the hemorrhage, and may appear clear, slightly tinged with red, or it may be dark red, resembling pure blood and even contain clots. When it is of a distinct red color, it appears opaque and if allowed to stand in a vessel for a few hours the corpuscles settle to the bottom and there is a distinct stratum of clear urine above. In this way the condition can be readily differentiated from hemoglobinuria as here the urine is either a bright red and transparent or dark brown in color and remains the same when allowed to set in a vessel.

When examined under the microscope without staining the urine in hematuria shows large numbers of unaltered red cells which retain their shape remarkably well

for a number of days if the urine be placed in a cool place; leucocytes and bladder epithelium are also present. The urine is alkaline in reaction.

Morbid Anatomy

When an animal dies of red water or is killed in the last stages of the disease, the carcass is always much emaciated. The subcutaneous tissues and skeletal muscles are flabby and appear pale. The blood is thin and watery and coagulation tardy.

Upon opening the abdominal cavity the contained viscera appears pale, resembling very much that of an animal which has been bled to death. In a few cases there have been observed a few slight hemorrhages on the peritoneum covering the spleen and intestinal walls. The liver and kidneys usually appear paler than normal, but are not enlarged. These show, upon microscopic examination, cloudy swelling of their cells, which sometimes has advanced to fatty degeneration.

Inverted Bladder from a Case of Red Water Cow, Showing Numerous Varying Sized Pedunculated Lesions

The spleen is usually normal in size and in microscopical appearance. The same is true of all lymph nodes both somatic and visceral, the heart, lungs, the entire digestive system and other organs. The bladder is the chief and only seat of red water lesions.

If the case be one of purely red water without complications, the external surface of the bladder is normal, but appears dark in color on account of its bloody contents. It may be very much distended, especially so if it contains clots which have been sufficiently large to obstruct the urethra, and be full of bloody urine. If the contents are fluid and free of clots the viscus is only moderately distended. Upon opening the bladder one finds distributed over various parts of the mucous membrane blood red areas varying in size from mere pin points to a diameter of several inches. There is a great variation in the number and size of these areas in different cases of hematuria. The most dependent portion of the bladder seems to be the first to show these lesions, but later all portions of the mucosa may become involved. In some cases most of the lesions are pedunculated, being attached by a small fibrous tissue neck and freely movable. In other cases the lesions are mostly sessile and small but in most cases both varieties of lesions are to be found. In some cases there are also noted a few elevated areas which are pale and quite firm. The mucous membrane of the bladder between the lesions is always much thickened, showing in places evidences of healing by scar formation. These cicatrices probably account for the surprisingly small number of lesions in some of the long-standing cases of red water.

It is impossible to determine the duration of the disease by the size and character of the bladder lesions. The hemorrhage from the bladder is sometimes just as severe from small lesions as it is from large ones in advanced cases.

The small red sessile lesions are composed of dilated blood vessels, mostly veins, filled with blood and surrounded by fibrous tissue.

The epithelium covering these is usually increased in thickness or it may be entirely eroded, in which case hemorrhage takes place from them. The large red pedunculated lesions are composed of a series of venous sinuses of varying size and separated by fibrous connective tissue trabeculae. They resemble very much normal erectile tissue or again they may be likened to the blood spaces seen in cavernous heman-

giomas. These sinuses are usually lined by a single layer of flat epithelial cells.

The epithelium covering these lesions is quite variable; sometimes it is seen to retain its transitional type, at others it seems much altered, and one can always find areas where the epithelium has been eroded. The bleeding in hematuria no doubt takes place from these eroded areas.

In some cases of red water the bladder lesions on the mucosa may be complicated as the result of infection which may produce a cystitis or an ascending pyelonephritis. Rarely in other cases complications may be due to new growths such as papillomata or carsinomata.

Treatment

Any form of treatment in this disease, at best, has thus far been found unsatisfactory. Many different drugs have been used and a great many seem to cause temporary relief, i.e., there is following their use a temporary subsidence of the discharge of bloody urine. This, however, can not always be attributed to the drug administered, for we find the same subsidence and recurrence of bloody urine from day to day in animals receiving no treatment whatsoever.

Calcium chloride has been given by some authorities a very prominent place in medicine as an internal hemistatic. This property is said to be due to the power the drug possesses of increasing the coagulability of the blood. If this be correct, it would undoubtedly be indicated in such diseases as hematuria. That the discharge of blood temporarily ceases in some cases of red water after administering calcium chloride is readily demonstrated. On the other hand, increased coagulability of the blood was not evident after administering the drug in cases where we have had opportunity to test this property.

Calcium chloride and also the lactate in one ounce doses daily have been recommended to many owners of red water cows, but results have varied greatly. Some have obtained very gratifying results, claiming that the urine cleared up after administering two or three doses, while others have used the drugs for periods of two weeks or more with no benefit whatever.

Other drugs which seem to arrest the cystic hemorrhage temporarily are: Lead acetate given in four-gram doses alternately with solution of ferric chloride four grams once daily; Epsom salts in laxative doses; potassium iodide, potassium chlorate, iodine and quinine. Many others of course have been used by veterinarians and others in the field, but no satisfactory results have been obtained.

Injections of astringent lotions into the bladder seems to be of little value. When this method of treatment is used, great care must be exercised, as any slight irritation of the vascular lesions in the bladder of red water animals will erode their covering, which is very thin, and cause an outpouring of blood. In cases where the urine has become perfectly clear, passing of a soft rubber catheter into the bladder will invariably produce a hemorrhage.

We have tried injections of adrenalin, normal salt, weak alum, and tannic acid solutions into the bladder, but results have been unsatisfactory.

Disposition of Affected Animals

From what has been said in the foregoing pages it is obvious that although red water is not a rapidly fatal disease, it is one that is most certain to cause a depreciation in value and eventually death in an animal that has contracted it. For this reason and for the further reason that it is apparently an incurable malady at the present time, it is suggested that the affected animals be disposed of early.

The disease seems to be essentially a local one, confined to the bladder, and so long as an affected cow is in good physical condition the meat may be considered perfectly wholesome. Hence, the most profitable procedure under the present circumstances would be to fatten all affected cows and dispose of them for beef. It is also important not to breed a cow after she has once contracted the disease, as the act of parturition always seems to aggravate the condition.

Practical Points on Bang's Disease Eradication

By CHAS. H. KITSELMAN, Manhattan, Kansas
Department of Pathology, Division of Veterinary Medicine, Kansas State College

MANY practitioners have never organized the available information on Bang's abortion disease into a workable field plan and consequently when a snag is met in a given herd they are at a loss as to the best plan to follow.

The blood test, be it either the rapid plate or the long tube method of performing the agglutination test, can not be relied upon as the sole factor in eradicating this disease in cattle. There are other factors of great importance which must be considered in outlining a course of procedure for the owner to follow. Let us introduce these factors into the discussion in following through the history of a typical herd.

The practitioner draws samples and either ships them to a reputable laboratory or runs them himself and finds for instance 20% of the herd to be reactors in dilution of 1-50 or higher. The owner when informed of this fact is usually surprised, particularly if his actual abortion loss for the preceding year has been small. It is needless to add that he is also discouraged because usually this number includes several of his best producers and if he is maintaining a dairy herd this fact is a matter of grave concern to him.

The practitioner is asked next to outline a practical course of procedure, looking forward to either the establishment of a clean herd in the immediate future or if the physical facilities are inadequate then a clean herd at a more distant time. His course must be practical on this particular farm.

Let us analyze our laboratory report and advise our client in detail. Beginning with the reactors in dilution of 1-50, find out their ages and both past and present breeding histories. Practically all calves suckling blood positive dams or drinking herd milk where there are blood positive cows in the herd will be blood positive calves. If these calves are turned on to neutral ground and fed milk from blood negative cows they will in all probability lose their positive reaction in from several weeks to as many months. As such calves near sexual maturity their chance of becoming blood negative diminishes and after they are bred the probability is that there will be no change in their agglutination titre until after they calve. The mature 1-50 reactors, if pregnant, should be considered in the same class as those which react in higher dilutions or as positive reactors. If they are open a retest in six weeks usually is decisive, because such cows either become 1-100 or higher, or else completely lose their reaction and become negative. A doubtful reaction (1-50) occurring in the latter part of pregnancy should be received with a great deal of suspicion and handled accordingly. Bulls reacting in this dilution usually become negative in a few weeks and a retest made in 30 days on the herd will show them to be negative in most cases. Animals apparently become negative during this period whether used in service or not and no bad results have followed where such bulls were used in clean herds.

In herds where the physical equipment is adequate and the reactors include some good individuals whose blood lines or past production history renders their disposal a financial loss of some moment, then by all means outline the dual herd plan, that is, the maintenance of a clean herd and an infected herd. Keep these units as far apart as possible and care for the clean herd before the infected herd.

Even in the dual herd plan it is a very good policy to make all the cows calve in a previously prepared maternity stall, one that

is readily cleaned up and disinfected before the cow is put in it. Obviously the maternity stall used for the positive reactors should be as far from that used by the blood clean cows as the premises permit. All cows before leaving the maternity stalls should be washed carefully with an antiseptic solution from the tail head down over the thighs, hocks, and feet, the assumption being that 95% of the infection is spread at calving time.

We do not like to use the blood test as a 100% criterion in deciding to dispose of a cow, but consider also the fact that a cow if blood positive and a poor or indifferent breeder can well be sent to the butcher. On the other hand if a good producer she may be too valuable to condemn just because she is a blood reactor, but should be isolated until her breeding history warrants her disposal.

In some herds where an intelligent study is made of each cow's age and breeding history the additional information that she is a Bang's disease reactor tilts the balance against her and makes a decision easy to make.

There are many herds which do not have sufficient equipment to handle two herds and here the practitioner must work out a plan which will be practical and will yield good results. To return to a previous statement that 95% of Bang's disease infection is spread during the act of aborting or calving, then logically if we can localize this mass infection and thoroughly destroy it, the herd infection will gradually become lower and finally disappear.

A thoroughly practical plan which the author has tried and which has given good results elsewhere is based upon this procedure: A list of all the breeding cattle is kept and their blood reactions listed on a semi-annual test. Two sets of maternity stalls are prepared and the further apart they are placed the better will be the results. One set of stalls is for the reactors and the other set for the blood negative cows. All fresh cows should be thoroughly cleaned up before reentering the herd, and no cows having a discharge should be released from the isolated maternity stall. The calves from the blood reactors should be weaned as soon as possible and then fed milk from the blood negative cows.

In one large dairy herd the infection dropped 10.8% in eleven months by following this system and should become practically clean in a relatively short time. A striking fact observed during this period was the marked lessening in cases of calf scours and udder troubles.

There is still another class of owners, and their future clean-up plan is problematical and depends more on their conscientious following of a plan than any of the other plans. This plan presupposes a highly infected mature herd, that is, a herd where the laboratory report shows practically all of the mature cows to be reactors. The only thing that such an owner can do is to either sell off his reactors and restock with blood negative cows after a thorough clean up of the premises, or he can keep his herd intact and isolate his young stuff, testing them from time to time to keep them blood negative. These young heifers can be bred and when enough of them are fresh the owner can sell his mature herd, thoroughly clean up and disinfect the barn and corrals, and can then move the young blood-negative herd into the barn. He has the advantage of retaining his herd blood lines, restocking with animals of known breeding history, and, more important still, the financial sacrifice is not prohibitive. It has been proved that an infected barn can be cleaned up, and further that blood negative animals can be put in it and that they will remain blood clean for an indefinite period.

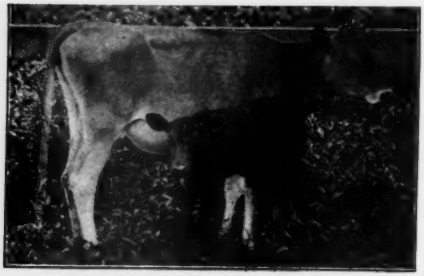
It has been observed that one can not exercise too much caution in adding replacements to a herd of cattle. Do not add pregnant cows to a blood clean herd, even though they pass a clean blood test, unless from a blood tested herd. Keep such cows in isolation until four weeks after freshening and if they have normal calves and pass a clean test at that time they can be added to the herd without danger.

There is some basis for the belief that an animal has a much better chance of becoming blood negative if it is not bred than it does if bred as a reacting animal. Some cows in an experiment lost their reaction when kept in isolation and unbred for periods ranging from three to nine months and to date have remained blood negative.

The importance of a blood positive bull is a question which has not been decided conclusively, but a reacting bull should not be used on blood negative cows, except where no blood negative bull is available, and then one must be prepared to expect the worst. Such a bull has been used in isolated (blood positive) herds and a good calf crop obtained. In another herd a blood positive bull was used to breed five blood negative cows and after eight months three of these cows are still blood negative and are carrying their calves. The other two cows did not conceive. The semen of this bull cultured negative for Bang's bacillus.

To summarize the information available regarding the eradication of Bang's abortion disease:

1. Obtain the breeding history and the age of all the animals in the herd.
2. Blood test the entire herd.
3. Carefully check each reactor against its breeding history.
4. After a careful survey of the equipment and the buildings available, outline a workable plan for the owner to follow, always remembering that an owner may be prejudiced in favor of an animal which he may feel inclined to keep at least for a while, even though you can see but little advantage to be derived therefrom.



Thirteen-month-old cow and her calf. Photo by Dr. R. C. Riegel.

THE RUMINANT STOMACH IN HEALTH AND DISEASE*

I think a certain knowledge of the physiology of an organ is absolutely necessary to any degree of understanding of its pathology. We are not teaching enough applied physiology in our veterinary schools. Our diagnosis and treatment would be better if we knew more physiology.

Twenty years or more ago, we had very different ideas about the ruminant stomach, from what now obtain. Since the war, the rapid increase in the amount of cattle practice has forced upon us the importance of this subject. It is hard to teach something that we are not sure about, and so a study of the rumen of the living bovine was taken up. Unfortunately, we were forced to discontinue this study before it was completed. A little is still being done; but there is a need for more.

Our studies in North Dakota were made mainly through gastric fistulae in 20 different animals, varying in age from 10 days to 13 years. The study was made by the use of a light in the rumen and observations by feeling and by graphic records of the motility of the organ.

The first fistula that we made in the rumen was a failure, because when it healed, the muscle tissue was exposed, and it was so sensitive as to interfere with movement when the arm was passed through the fistula. After this we worked out a plan by which we had a skin-lined fistula, and this worked well.

However, we found that we needed to plug the opening when observations were not being made. Without this plug, in the winter, considerable body heat was lost, and in the summer, the contents of the rumen was apt to dry out.

This investigation resulted in many surprises. For example, the anterior pillar of the rumen is a tremendously strong, muscular organ. I weigh 230 pounds, but my full weight leaned against this pillar, did not prevent its contracting.

Normally, the upper half of the ingesta of

*Notes from an address by A. F. Schalk, Columbus, Ohio, at the Eighth Annual Post-Graduate Short Course for Veterinarians, Michigan State College, East Lansing, January 26-30, 1931.

the rumen is moist and the lower half a liquid. In the reticulum, it is just the reverse. The solid matter is in the lower part and the liquid floats above. All parts of the rumen have a definite motility, the movement starting in the lower anterior portion, and extending upwards and backwards.

Rumination depends upon: (1) The stimulant; (2) the amount of food in the rumen; and (3), the amount of liquid in the rumen. Movement in the rumen could be readily started by irritation with the fingers of certain portions of the mucosa. The amount of liquid in the rumen is very important. The contents must be up to a certain degree of moisture before rumination will occur. Suppression of regurgitation (loss of cud) is usually due to a lack of moisture in the rumen.

In remastication, an average of 30 bites are taken on grass and 50 to 60 bites on harder material. Chewing on anything from 90 to 100 times, means that there is trouble with the teeth.

We passed the stomach tube many hundreds of times in the course of this investigation, using both the para rubber tube and the garden hose. In passing a tube up to one inch in diameter, we preferred the nostril to the mouth. The tube can be passed more readily through the nostril in the cow than in the horse. Nine times out of 10, when the tube is passed, it will go over the anterior pillar and into the rumen, and this is fortunate, because that is where you ordinarily want it. Once in a great while it will strike the anterior pillar and be deflected down into the reticulum.

We soon learned that when we removed all of the material from the rumen, that within 15 minutes the animal would be sick, hair would stand on end, it would draw its feet together, and have a pained expression. This would last three or four hours, perhaps longer. If we put food back into the rumen and sufficient water, within 15 minutes all symptoms of illness would disappear. It seems that this offers a practical suggestion for the practitioner who is performing a rumenotomy. Do not remove all of the material from the rumen, or if it is necessary to remove all of it because of its condition, fill the rumen about half full of chop or similar material, and put in eight or ten gallons of water before suturing the wound. In nearly all cases of suspended rumination, you can revive it by just putting in water, and then more water.

By the use of a large tube, one and one-half inches in diameter, passed through a mouth gag, we could readily wash out the contents of the rumen.

Of the agents that are supposed to stimulate rumination, we found only tartar emetic effective. This agent, in doses of 120 to 150 grams, was a pronounced stimulant. Barium chloride did not effect contractions of the rumen at all. Arecoline hydrochloride, in doses of not more than one-eighth grain, stimulated contraction of the rumen. Larger doses inhibit movement of the organ and cause abdominal pain. Eserine salicylate, in doses of not more than three-fourths of a grain, stimulate contractions of the rumen in 15 minutes. The increased contractions last for two hours. Lobelein sulphate was found undesirable for use in cattle.

TRANSMISSION OF PULLORUM DISEASE

H. Bunyea and W. J. Hall, found that pullorum infection was transmitted from diseased chicks to healthy chicks by exposure in an incubator for 18 to 24 hours from the time of hatching, without actual contact between the chicks. A large percentage of the chicks so exposed succumbed to the disease even under the most favorable subsequent brooding conditions. There appeared to be a seasonable variation in the death rate due to this disease, the losses being greatest during the height of the laying season. It was found that the hatchability of eggs in incubators was higher than under hens, but viability of hen-hatched chicks surpassed that of incubator chicks. The transmission of pullorum disease among incubator-hatched chicks was about the same as among hen-hatched chicks.—*Jour. Agr. Research,* U. S. 40, 1930.

SOME OF THE DAIRYMAN'S PROBLEMS IN THE PRODUCTION AND HANDLING OF DAIRY PRODUCTS*

The dairy business is the largest single industry, but it is in a bad way at present. The business depression which has curtailed the consumption of dairy products coincided exactly with the crest in our wave of dairy production. Milk is of unequaled value as food, because it contains a very unusual combination of proteins. The use that the animal organism can make of a protein depends upon all of its constituents. For example, the hog can made use of only 17% of the protein in corn. It can make use of 34% of the proteins in corn and oil meal combined, and if we can make a combination of corn, oil meal and milk, then the animal can make use of 67% of the total proteins in the three feeds.

The fat of milk is very easily assimilated and the sugar it contains is needed in keeping down intestinal putrefaction and maintaining the intestinal canal in a healthy condition. It is the best source of lime among the foods of man. Children should consume a quart of milk a day and adults a pint in a properly balanced ration.

Lowering the Production Cost

The average cow in Ohio produces 4,500 pounds of milk and 200 pounds of fat annually. It is wasteful to feed a cow of this low production for the average cow uses half her food in body maintenance and only half in milk production. Whereas, if she gave 9,000 pounds of milk instead of 4,500, the food required for body maintenance would not be materially different and she would have nearly three-fourths of her food for use in milk production.

There are 945,000 milk cows in the state. Of these, 12,900 belong to members of 25 milk testing associations (dairy improvement associations). These 12,900 cows belonging to milk testing associations, give an average of 7,600 pounds of milk containing 322 pounds of butter fat yearly. If all the cows in the state averaged as good as the average of cows belonging to the dairy improvement associations it would require but 600,000 cows to produce our milk. This would save the feed and labor required for 345,000 cows. A tremendously important saving in times such as these.

The Value of High Quality

Quality is an extremely important item in milk production. First, the farmer should have quality milk for his own family and second, the dealer is interested in quality milk because the consumers will buy more of it and thus increase the dairyman's market. I was recently talking with the superintendent of the McCormick Farm at Byron, Illinois, and he told me that employees coming to that farm frequently say they do not drink milk and don't like it. But when they have the opportunity to get quality milk produced on that farm, they soon become very large consumers of milk; and so we find the farmer is interested in quality milk, the dealer is interested in quality milk, the consumer should be interested in quality milk and the health officer of course, must be interested in quality milk.

You can't make good milk, good ice cream, or good butter out of poor milk. The farmer holds the key position. If he produces milk of poor quality nothing that can be done to it afterwards can make it of high quality for the consumer.

There is an almost unlimited market for quality butter. It is poor quality butter that is a drug on the market, and I don't blame the consumer for not eating it. I would eat oleomargarine myself before I would eat butter made of lots of the milk that I have seen. The oleo manufacturer can duplicate the appearance, the color and the odor of butter. The flavor is the only thing he cannot duplicate and the farmer should see to it that the flavor of his product stays with the milk until it reaches the consumer in whatever form.

Composition of Milk Is Stable

The quality of milk depends upon how it is handled. Quality milk must contain a minimum of dirt and a minimum of organisms and none of these organisms must be harmful.

The chemical composition of milk can be

* Notes from an address by Prof. Chas. L. Blackman, Columbus, Ohio, at the Sixth Veterinary Conference, Ohio State University, Columbus, March 18-20, 1931.

changed to some extent by the feed, but you can't change the fat content except by the administration of cod liver oil, which decreases it. Vitamines in milk can be increased by feeding fish oil meal.

Vitamine A, a preventive of diseases of the eye, reaches the milk from the green leaves eaten by the cow. Vitamine B may be contained in the cow's food or may perhaps be produced by yeast growing in the rumen. It is the anti-neuritic vitamine. Vitamine C, the cow gets from the pasture. This vitamine is unstable and is to some degree lost by oxidation. Cooling, transporting milk in partly filled cans, pasteurization, all decrease vitamine C. It is very easily supplied, however, by orange juice or by tomato juice. Vitamine D occurs in moderate amount in butter fat. The fat in milk is almost the only fat eaten that contains any considerable quantity of vitamine D. Vitamine E is present in milk in but slight amount, it is probably not important in the food of man, i.e., no ordinary diet of man is likely to be deficient in vitamine E.

The color of milk is due to the feed. The effect of breeds is probably only indirect, that is, some breeds absorb carotin from the feed more readily than others and thus color the milk and the butter more than others.

Bang's Disease

Bang's disease is primarily an economic problem. Entirely aside from its public health aspect, farmers must get rid of abortion. If the milk is sold raw, eliminating the Bang organism, should be a matter of regulation.

Veterinarians' Responsibilities

Veterinarians can do much to improve milk production by spreading information regarding better methods. They should recommend a different routine to the dairyman such as light feed for two weeks before calving; a box stall in which to calve; the owner to be on hand at calving time; calling a veterinarian when needed; placing a halter on the cow and tying her up as soon as she has calved so that he may know definitely whether the fetal membranes are passed or retained; blanket the cow in cold weather; pursue methods that make for a quality production; feed feeds that make for efficient production.

Educators cannot do regulatory work, but regulatory workers can carry on educational work profitably. It is the easiest way of carrying on their regulatory duties. In fact none of our regulatory work will get very far unless it is also educational. The milk inspector should be a farm raised boy and should know the dairyman's problems from the dairyman's side.

USE OF ULTRA-VIOLET LAMP*

The effects of ultra-violet light depend upon its effect upon living and dead tissues. Man has employed the effects of ultra violet light for a long period, both in the treatment of disease and to increase his feeling of physical well being in comparative health. There is abundant evidence that sun worship clear back to the dawn of recorded history and probably earlier, took place when the ultra-violet light in sunlight was at its maximum. The feeling of well being that follows a sun bath was doubtless mainly responsible for the popularity of such baths among the ancients and it is responsible now for the hegira to Florida in winter and to the sea shore and the mountains in summer.

Seventeen hundred years ago, physicians used sunshine in the treatment of rickets, which of course meant that they were employing ultra-violet light. Fifteen hundred years ago, ground oyster shells that had been exposed to intense sunlight on the Mediterranean beach was used in the treatment of rickets and this, of course, was a precursor of viosterol.

The treatment of disease, particularly the use of sunlight in such treatment, is so bound up with religious ceremony among the ancients that it is sometimes difficult to tell just how much of the measures taken were the result of physical benefits experienced and just how much were due to religious motives. Ancient man had a very pleasing, comfortable trait of making a re-

*Notes from a discussion at the Sixth Veterinary Conference, Ohio State University, Columbus, March 18-20, 1931.

ligion of the things that he liked to do or of the things that he found it was profitable for him to do. In this, he was the direct antithesis of the Puritans of our early Colonial history who regarded pleasures in general as being irreligious.

But, knowing this trait of the ancients to attach religious importance to things that were pleasant, we can quite readily believe that the whole ceremony of sun worship of the ancient Egyptians and other primitive people and of our early American Indian came about because they learned by experience that such practices contributed to health and physical well being.

Light is a form of energy. Ultra-violet light depends for its stimuli upon very short waves. Its use may be classified in four groups: (1) Minimal, which has no therapeutic effect; (2) submaximal, which is the degree usually used in therapeutics; (3) maximal, which is used for certain purposes as the destruction of new growths; and (4) supermaximal, which is lethal.

Its effects are: (1) excitation; (2) inhibition; (3) abolition; and (4) lethal.

That the effects of sunlight are not due to heat alone has long been recognized. The effects of ultra-violet light on the tissues may be classed in three groups: (1) Effect on the surface; (2) inhibition of enzymes and harmones; (3) precipitation of proteids.

NEW GROWTHS IN THE SINUSES OF CATTLE*

The occurrence of new growths and accumulations of pus in the sinuses of the head in cattle is not uncommon. Until the process has progressed to a point where there is observable bulging of the sinuses or interference with respiration or both, the symptoms are not characteristic and diagnosis may be made only with considerable difficulty. However, one symptom that should lead one to suspect such a condition is the occurrence of fits or convulsions from time to time, the animal usually recovering promptly and appearing well in every respect until the occurrence of the next convulsion. Others again require several days for recovery and during this time there is a tendency to push forward in the stanchion or to push the head against a wall.

When such symptoms are observable, the animal should be put in a stanchion and a careful examination made of the head. When the hair is long and somewhat roughened and enlargement of the facial sinuses exists, it may not show on general inspection but may be revealed by careful examination. Dullness may likewise be detected by percussion and a slight discharge from the nostrils may be discovered.

A history of the animal having been dehorned two or three months previously, even though the dehorning wound healed nicely, may help to establish the diagnosis of an accumulation of pus in the sinuses. The diagnosis is confirmed, of course, by opening the sinus. If the trouble has developed following dehorning, the horn stub should be sawed off shorter so as to open the sinus to permit its evacuation and the use of the probe. The anatomy of the parts are often changed in such conditions and one should depend upon the probe to locate the most dependent part of the sinus, where an opening should be made with a trephine. Where the bony plates are greatly softened, the diagnosis is rather unfavorable, and in animals of ordinary value it is best to advise their sale for slaughter.

Where treatment is undertaken, the sinus should be irrigated daily with a mild antiseptic solution. It is well to start with a 2% solution of potassium permanganate and decrease the strength of the solution gradually until a 0.5% is being given. The owner should be instructed to use a wooden or enamel container for holding this solution.

New growths encountered in these locations are usually malignant and the prognosis decidedly unfavorable. Particularly is the prognosis unfavorable if the new growth has extended to a point where meningitis has developed resulting in convulsions. It is not advisable to treat the animal where there is an injury to the cranium or to the meninges.

*Notes from an address by T. H. Ferguson, Lake Geneva, Wisconsin, at the Eighth Annual Short Course for Graduate Veterinarians, Alabama Polytechnic Institute, Auburn, February 2-7, 1931.

Canine Distemper

By H. W. YOUNG, Kansas City, Missouri

IN writing this paper on distemper, no attempt is being made to suggest a sure cure or prevention. Facts only will be stated as found in the general run of cases in daily practice in a small animal hospital.

Let us go back to our old text books and refresh our memories on distemper, as to history, etiology, etc.

Distemper is an acute, contagious and infectious disease of young carnivorous animals, characterized by febrile manifestations with an acute catarrh of the mucous membrane, frequently followed by catarrhal pneumonia and some cases by development of nervous symptoms.

History.—It is known in almost every country and in every tongue. It is supposed to have appeared in Europe first during the second half of the 18th century, having been introduced from Asia or Peru.

Occurrence.—It is most frequent in young animals, under one year of age, though quite common in dogs up to two years old. I have seen it in 12-year-old dogs. In our practice we do not consider a dog safe until after he has reached his second birthday anniversary. It also occurs epizootically at times, affecting many of the dogs over large territories. It is most prevalent in the spring and fall, or during seasons of changeable weather.

Etiology.—It is caused by a filtrable virus.

Pathogenesis.—It produces a febrile condition and in association with this is a catarrh of the mucous membranes, and inflammation of serous membranes, especially of the pericardium. If the animal survives the acute attack it is so weakened by it and its resistance so lowered as to favor the development of secondary infections. These are generally caused by bacteria, which are normally harbored in the healthy body. The most common of these secondary infections are pneumonia, purulent inflammation of the conjunctiva, inflammation of the mucous membrane of the air passages and intestinal tract, pustules of the skin and inflammatory changes in the nervous system.

The filtrable virus of distemper has usually disappeared when the secondary inflammation takes place.

Anatomical changes.—Generally there are small hemorrhages in the heart muscles. In some cases a serous fluid is found in the pericardium. In the majority of cases there is a great change in the respiratory organs. The mucous membranes become a bright red, swollen and covered with purulent secretions. Also there is a catarrhal pneumonia. The mucous membranes of the stomach and intestines show acute catarrh. Sometimes ulcers occur on the mucous membrane of the intestine.

The lymph glands of the thoracic cavity and of the mesentery show inflammatory swellings.

The liver and kidney show parenchymatous or fatty degeneration.

The spleen is but slightly, if at all, enlarged.

The eyes are usually affected with intense catarrh of the conjunctivae and sometimes ulcerative keratitis is present.

Symptoms.—The incubation period varies from 3 to 21 days. This is a very wide variation, but we find it to be true. The type of disease has no bearing on the length of the incubation period.

It is convenient to divide the disease into three types to simplify description: (1) Peracute, (2) acute and (3) chronic.

The peracute type is manifested by sudden inappetence, depression, groaning, fatigue, high temperature (from 103° to 105° F. and above) and death in three to five days. Recovery is rare.

The acute type is manifested by fever 103° to 104° F., where it remains for a period of 1 to 2 weeks, or it may drop to 102° to 102.6° F. in one or two days and rise again after three or four days. In these latter cases recovery is quite common in ten days. In more severe cases the temperature

may rise again at the onset of pneumonia or intestinal infection, or some nervous disorder may develop and terminate in the chronic type. These are manifestations of the true secondary infection but it is still called distemper by the veterinarian as well as by the layman.

The beginning of the disease is generally indicated by a change in disposition. An animal, usually bright and playful, becomes dull, obeys commands only after they are repeated several times, or obeys unwillingly, usually trembling over the entire body. The animal may appear startled suddenly and hunt a secluded place. The hair is generally dull, and the appetite capricious. Some times a spasm may be the first symptom noted, and it may be two weeks before any other symptoms develop.

After three to seven days, the most characteristic symptoms appear, which are catarrh of the air passages, sneezing and increased respiration due to the inflammation.

The discharge at first is clear, then serous or mucous, later purulent and tenacious. The gums generally bleed easily, and there may be a bloody discharge over the external surfaces of the teeth.

The nasal discharge dries around the nasal openings in brown crusts. Sometimes the discharge contains blood. Sometimes it is ichorous and irritates the skin over which it drains and which becomes raw.

The catarrh of the larynx and trachea is manifested by a cough, at first dry and harsh, later moist and weak and still later dry. The cough may cause vomiting.

Oscultation reveals rough rales. The eyes at the onset show a conjunctivitis with pain and swelling of eye lids. The conjunctiva is red and moist, the lachrymal secretion is increased in amount and becomes mixed with mucous and purulent discharges. The lids become stuck together.

Ulcerative keratitis develops relatively frequently in the pop-eyed breeds. The ulcers form on different parts of the cornea and quite frequently cause loss of sight.

Infection of the intestinal tract is manifested by loss of appetite, increased thirst, vomiting and acute gastritis. The vomitus is usually shiny, yellow and mixed with bile. The tongue is coated. Affected dogs are very sensitive over the stomach. At first there is constipation and this is followed by a diarrhea, the discharge being mixed with blood and voided with straining.

The urine usually contains albumen, some times bile, hyalin and cellular casts.

The nervous symptoms are nearly always present in every case though in widely varying degrees of severity. This may be shown by spasms in varying degrees. These spasms may last for only a second or for several hours. They may terminate fatally or may terminate in paralysis, or it may affect one quarter or even a single group of muscles and be permanent though the animal may recover otherwise.

The skin lesions appear in about 50% of all cases. Small red spots may appear on the hairless parts of the body, developing into nodules that contain purulent material. They dry and form crusts or scabs. The entire body may become covered with nodular pustules and give off a sweetish but unpleasant odor; sometimes the animal has the appearance of having had all the skin on the body burned and the surface sloughed away.

The pulse is usually accelerated, irregular and wiry due to the parenchymatous degeneration of the heart muscles. The animal becomes greatly emaciated during the attack. At the approach of death, they lie in a deep stupor, trembling, and generally die in a mild convulsion.

The course of the disease is varied; in the peracute type it runs three to five days. The acute form may show recovery in 10 to 14 days, while the typical or chronic form may last two weeks to three months.

Diagnosis.—In the early days of infection, diagnosis is almost impossible. The symptoms are so mild they may be confused with almost any of the less severe catarrhal conditions of upper air passages, etc. After the early stages distemper is distinguished from other catarrhal affections by the nervous symptoms and the pustular exanthema. The age of the animal, the high temperature, the catarrhal discharge from the eyes and nasal

passages, the cough, the bleeding gums, change in disposition, diarrhea, convulsions are means of differential diagnosis.

Prognosis.—This should be guarded. The morality runs from 10% to 70%. In the purely catarrhal and exanthematous cases about 70%, and sometimes even as high as 95%, recover. The most unfavorable are the nervous cases in which recovery occurs in not more than 10% to 20% of the cases. The more rapidly the symptoms develop, the less likelihood there is of recovery.

Continuous high fever indicates severe infection and grave changes may be expected. A rapid fall in temperature is also unfavorable.

Pampered, improperly nourished young dogs are the more severely affected. The larger and hardened animals (excepting the German Shepherd) withstand the disease more readily.

Treatment.—There is no satisfactory treatment for canine distemper. First of all, hygienic conditions and diet should be regulated. Animals should be kept warm—out of draughts, and furnished concentrated nourishment. Raw fresh meat, very lean, or boiled or roasted. Give raw fresh milk and eggs, if there be no diarrhea. For the gastric and intestinal catarrh, charcoal and bismuth may be used. I have been using (for diarrhea) a carbo-catechu mixture in No. 10 capsule doses, one, two or three capsules at a dose, to check it in large dogs. Every case as soon as diagnosed receives Mixed Bacterin Canine. This bacterin is repeated on third or fifth day, depending on the systemic reaction to the first dose.

We know the digestion is impaired and therefore feed a small quantity of highly concentrated food. The blood stream also has lost its mineral balance. Therefore, something must be done to help nature bring this back to par. For this we use a high vitamin—mineral compound.

For depression we give alcoholic stimulants containing predigested foods, thereby feeding as well as stimulating. The fever requires no particular attention as long as it does not go above 103.6° F. for any length of time. If desired, acetyl salicylic acid, phenacetin or antipyrin may be used to reduce it.

The catarrh of the respiratory organs really requires nothing but warm, dry fresh air. If pneumonia develops, bryonia and aconite prove of value if not pushed too far.

The gastroenteritis may be treated with alkalines and carbo-catechu. The nervous symptoms, especially spasms, must be allayed with anodynes or anti-spasmodics.

The paralysis may be treated with sunlight or with ultra violet and infra red lamps. The eyes should be given saline washes and treated with an antiseptic eye ointment. If ulcers form, cauterize them with silver nitrate and apply a silver salve.

The exanthema requires very little special care. It may be treated as any open wound, though sometimes it is very hard to overcome.

Every case we treat gets the following, some get more, but none get less.

1. A Mixed Bacterin Canine, repeated at three or five-day intervals.
2. An alkaline compound to allay acidity as all infectious cases have an acidosis. We try to alkalinize the whole system.
3. A big dose of homologous serum.
4. A diet of animal protein.

Prevention.—As far as I know a sure way to prevent distemper has not been discovered.

Science has taught us the value of vitamines in maintaining health and building up resistance to disease. Therefore, we advocate feeding vitamine mineral compounds, and administering serums.

We have kept close record of all dogs vaccinated at our hospital and the old serum and virus method surpasses the English method. Our records show for serum and virus 61% prevention, while with the English method, 87% of all dogs vaccinated have developed distemper on the fourth or fifth day following the injection of virus. I am still waiting for a sure preventive.

Keeping all pups and susceptible animals on clean runs, and feeding nourishing food, free from intestinal parasites, will help more when distemper comes than anything else that I know of.

Some Turkey Health Problems

By F. D. PATTERSON, Ames, Iowa
Iowa State College

THE first ten days of young poults' lives is a critical period and the mortality among them often runs high during this time. Young poults should receive their first feed when about 48 hours old. They should be fed little at a time but often (about 5 times a day) during the first week. Well cooked corn bread crumbs and hard-boiled eggs moistened with clabbered or buttermilk and made into a crumbly mash makes an excellent feed for the first week. Rolled oats can be added to advantage. At the end of this period cracked grain should gradually replace the above feed. A growing mash fed in hoppers should be added to the diet when they are about 10 days old. This mash should be put before them and left for increasing intervals for 4 or 5 days; at the end of this time it should be left constantly before them. Milk products especially clabbered and home made buttermilk are good for turkeys at any age and at any time. Fresh green food should be supplied for best results. If turkeys are reared on free range, turkey hens are by far preferable to chicken hens as mothers because they are quieter, are not as erratic and while they will range farther from home they travel more leisurely and are not as apt to walk the young poults to exhaustion as chicken hens are. The mother hen and her brood should be given a dry, clean, well-ventilated, roomy brood coop placed on clean ground that has not been used by poultry for some time previously. The mother hen should be confined to this coop until the poults are about 10 days old. The poults should be confined to the coop only when the grass is wet with dew or from rain. As soon as the grass is dry in the mornings the poults should be allowed their liberty. After the poults are 10 days old the hen should be turned out and from then on she will do most of the managing of her brood. The coop should be retained for them to roost in at nights during which time they should be confined until the grass is dry next morning. The confinement at night is also a protection against predatory animals. After the poults are feathered the dew will not hurt them. After the mother hen is given her liberty, cracked grain should be fed each night to encourage their coming home to roost, little else is necessary in range turkeys as they will and should be encouraged to forage for the greater part of their living. Milk products, if plentiful especially clabbered or home made buttermilk is very helpful and they should be given all they will drink. The principal dangers to range poults are blackhead, predatory animals, overfeeding during first week, dampness and chilling until they are feathered. The turkey range should be as far from chicken habitations as practical. Brood coops and feeding places should be frequently shifted to help prevent ground contamination.

Artificially hatched and reared poults can and should be kept entirely away from poultry habitations. Strict sanitation and frequent rotation of outside runs where dirt floors are used should be practiced. The same general principles that apply to chickens should be used in rearing turkeys. The principal dangers that beset artificially reared poults are overfeeding, chilling, overcrowding, overheating, unsanitary surroundings and blackhead.

Blackhead is by far the most important disease that affects turkeys and is perhaps the cause of more losses and failures than all other factors combined. This disease is especially common in low, flat, sticky, fertile, poorly drained sections. A rolling or hilly country with light, porous, easily drained soil is best adapted to

range production but even in the most favored sections soil contamination may become so bad that profitable range production becomes impossible. Range production is to be preferred to other methods where conditions will permit and soil contamination does not prohibit. The confinement plan was adopted largely to get around the above difficulty. Blackhead usually makes its appearance in the flock when the poults are from 2 to 4 months old but may even infect mature birds. The younger the poults when it appears the more disastrous are the results likely to be. Blackhead is caused by a single-celled protozoan parasite, the *Histomonas meleagridis*. Affected poults become droopy, listless, diarrhea frequently sets in early, the feces are usually sulphur yellow in color and generally contain fine granules of the same color. The diseased brids frequently are clinically anemic and emaciated. Cyanosis of the unfeathered parts of the head is sometimes observed hence its name. The birds usually become prostrated and die after a few days. It may however, terminate in the chronic form and the birds may last for weeks or months. Few ever recover. The characteristic lesions are irregularly round, yellow, caseated, necrotic, depressed areas in the liver. These areas vary much in size. The ceca are usually much enlarged and filled with yellow caseated necrotic material. One cecum is, as a rule, much more involved than the other.

There is no curative treatment that we know of. Control, hygienic and sanitary measures are of the most importance. Sick birds should be isolated as soon as observed. Runs should be changed. Badly infected ranges may have to be abandoned. If medicinal treatment is desirable an initial dose of epsom salts followed by ipecac or catechu in drinking water as a flock treatment may be used. No curative effect whatever should be expected from this treatment. It may or it may not aid in the control of the disease. Considerable evidence has been obtained to incriminate the cecal worm as a carrier of the *Histomonas meleagridis* so turkeys should be kept entirely away from chickens.

Turkeys are susceptible to fowl typhoid, cholera, colds, roup, pox, internal and external parasites, etc. Control is carried out along the same principles as in chickens.

VENTILATION AND HEATING OF POULTRY HOUSES*

The desideratum in the construction of poultry houses is to so build them that the birds may be supplied with a constant quantity of fresh air without draft and so that the houses will remain dry and furnish protection to birds from the extreme cold of some of our winter weather in Michigan.

In this climate poultry houses should be insulated. The temperature of the house is largely controlled by the insulation where artificial heat is not used and ventilation depends to a large degree upon the temperature. Some experiments were made here at the college with uninsulated and insulated houses. The temperature in an uninsulated house when it was —12° F. outside was found to be —6° inside. Another time when it was —5° outside it was 2° inside, a difference of only 6 or 7° in each instance.

Experiments with insulated houses when the temperature was —14° F. outside it was 12° inside, and on another occasion when it was —4° outside it was 16° inside, a difference of 26 and 20°, respectively, or about three and one-half to four times the difference in temperature shown by the uninsulated houses.

A straw loft on even an otherwise uninsulated house adds much to its value. It is possibly open to the objection that this is dusty and dirty, but this objection is not serious and it does furnish good insulation and means greater comfort for the birds. Lice and mites may be harbored in the straw loft, but this should not occur. They do not get into the straw loft until long after they become a nuisance in the poultry house,

*Notes from an address by J. M. Moore, East Lansing, Research Assistant in Poultry Husbandry, Michigan State College, at the Eighth Annual Post-Graduate Short Course for Veterinarians, Michigan State College, East Lansing, January 26-30, 1931.

and the man who has lice and mites in his straw loft is some several weeks to several months late in beginning to fight them. Twenty to 25 inches of straw is about the right quantity. It may be held up by poultry netting nailed to the rafters. It will not need to be changed oftener than once in six years, and I know of one instance in this state where the straw remained in the loft for 17 years and was still in pretty good condition. It is necessary, however, to keep sparrows out of it by screening.

When a poultry house smells fresh and clean and when the litter will remain on the floor for two weeks without becoming damp the house is well ventilated.

Floors should be well insulated.

During severe cold spells in the latitude of Michigan the artificial heating of poultry houses, will be found advantageous. The use of brooder stoves offers a very practical method of supplying this heat. One stove should handle a 20x40 feet poultry house.

A more expensive plan is to have hot water pipes in the flooring where a concrete floor is used. This is the most satisfactory plan of all but requires a considerable initial expense to install.

PARATYPHOID "B" CUTANEOUS INFECTION IN DOG

A one-time valuable high school German Shepherd dog, with a cutaneous and subcutaneous infection of over a year's standing, was brought to a laboratory for diagnosis. This animal was extremely emaciated with bloody serous pus exuding from lesions between his toes and from numerous lesions all over his body. Local and internal treatments had at times seemed to help for a time, but a recurrence always followed.

Cultural findings revealed a mixed Para. "B" and streptococcic infection. (The identity of Paratyphoid "B" gained by cultural means at a later date.) An autogenous bacterin was made and sent to the veterinarian in charge, and it is presumed that desired results must have been obtained, otherwise the veterinarian would have reported.

COWS IN COMPETITION

For some time past, Belgian dairymen and farmers have claimed pride of place for their cows, declaring them to be infinitely superior to the French variety. France has retaliated by stating that the native cow has no equal, that its milk and butter have ever been unsurpassed, and that the Flemish animal is greatly overrated. The hoped-for "entente" between the two countries being in danger, the French and Belgian Ministers of Agriculture arranged that representative cows from France and Belgium should meet in friendly contest at a recent show. The farmers of the latter country, confident in the superiority of their cattle, agreed, and with the result that Belgium has beaten France. Never was victory more overwhelming.

Out of the nine cows to carry off prizes, no fewer than seven were Flemish, the best of the French animals being relegated to the fifth place. The Belgian milk-cow which bore away the first prize yielded 64.5 kilos of milk (about 142 lbs.) in forty-eight hours, while the milk produced by another prize-winner in twenty-four hours resulted in three pounds twelve ounces of butter being made. The two French cows on the honors list came nowhere within reach of these figures.

The success of the Flemish cattle has given rise to no little jealousy, the unsuccessful exhibitors claiming that the conditions were unfair. The French pointed out that the Belgian milk-cows, being habitually kept under cover, were perfectly at home in their stalls at the show and able to eat heartily, whereas the hardy cows of France, accustomed to feeding in the open, missed their pasturage, and consequently yielded an inferior quantity of milk. The Flemings, with characteristic humor, replied that the French and Belgian Ministers of Agriculture should have been asked to add a large meadow to the extremely limited space in which the show was held. Meanwhile, meadow or no meadow, the Flemish cows proved, in every respect, super-

ior to their competitors. There is no getting away from the irrefutable fact.

The French Minister of Agriculture has congratulated the cow-keepers of France on the increase in the milk production. During the last twelve months it has risen, and the public live in hopes that the pre-war price will soon be reached. But this, alas, is unlikely, the annual output still being some million gallons less than it was ten years ago.

Paris, France. George Cecil.

THE PATHOLOGY AND BACTERIOLOGY OF THE BOVINE UDDER*

A study of the bacterial flora of 92 animals that had been under observation for a considerable period, was undertaken. The agglutination test for Bang's disease had been made in this herd right along since 1925. A study of the bacterial flora of each quarter was made separately.

The structure of the udder may be reviewed with advantage. It consists of parenchyma and stroma. The parenchyma consists of alveoli from which lead tubules. These tubules connect with larger tubules eventually ending in the milk well. The stroma consists of an intralobular, a very delicate structure, and a stronger intertubular structure.

The pathological changes that occur fall in four groups:

1. Interstitial mastitis, in which there is an increase in the interstitial tissue. There is a marked thickening of the structure mainly due to an infiltration. In mastitis due to *Br. abortus* infection this was the principal change found. Sometimes it existed to a degree that almost obliterated all alveoli.

2. Exudative mastitis. In this type of inflammation there is little effect on the stroma but the alveoli are packed with cells. This is a characteristic feature of mastitis due to a staphylococcus infection.

3. Suppurative mastitis. This is a severe type of exudative mastitis. It may destroy the parenchyma and practically fill up the tubules with greatly thickened epithelium. If it continues for a period we get: the fourth type of mastitis.

4. Fibrosis mastitis.

Of the 92 animals in the herd, 41 reacted positively to the agglutination test for *Br. abortus.* Of the 164 quarters in these 41 animals, *Br. abortus* organisms were isolated from 41 quarters or just 25%.

Of the 92 animals 34 or 37% contained streptococcus infection alone. Eleven or 12% contained *Br. abortus* organisms alone. Four or 4.3% contained staphylococcus organisms alone. *Br. abortus* and streptococcus combined were found in 13 animals or 14.1%. Staphylococcus and streptococcus combined were found in nine animals or 9.8%. Streptococcus, staphylococcus and *Br. abortus* all three were found in 6 animals or 6.5% of the herd. *Br. abortus* and staphylococcus occurred in two animals or 2.2% of the herd. Thirteen animals or 14.1% of the herd contained neither *Br. abortus,* streptococcus or staphylococcus in any quarter of the udder.

Therefore, the streptococcus was concerned in 67.4% of the animals, *Br. abortus* in 34.8% and staphylococcus in 22.8% of the cases.

Infection does not spread from one quarter of the udder to another, except as contamination occurs through the teat orifice and as it would spread to another cow. Although the demarkation between quarters on the same side is quite indistinct there appears no connection between the lymph or blood circulation or secretory system of adjacent quarters.

Although 79 of these 92 animals revealed either streptococcus, staphylococcus or *Br. abortus* organisms or a combination of these organisms in one or more quarters, only nine animals in the herd showed any clinical symptoms of mastitis.

In the animals reacting positively to the agglutination test for *Br. abortus* we found the organism present in one or more quarters in 63%.

We cannot regard streptococcic mastitis as other than a definite infectious disease.

*Notes from an address by L. B. Sholl and J. P. Torrey, East Lansing, at the Eighth Annual Post-Graduate Short Course for Veterinarians, Michigan State College, East Lansing, January 26-30, 1931.

The Transmission of Periodic Ophthalmia of Horses by Means of a Filterable Agent*

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IN A previous communication one of us together with Burky reported the results of a bacteriological study of periodic ophthalmia in horses. Both aerobic and anaerobic cultures of eyes freshly enucleated from horses with both active and quiescent periodic ophthalmia, were uniformly negative. The disease, however, has been shown by others to be definitely transmissible by inoculation into a normal eye of an exudate from an eye that was the seat of active disease. The purpose of this paper is to report the pathology of the disease as observed in the epizootic which we have investigated and to publish observations indicating that in this particular epizootic the disease was caused by a filterable agent.

Disease Studied in Maryland

In the fall of 1926 there occurred a sudden outbreak of periodic ophthalmia among thorough-bred horses on a farm located in high-rolling country in northern Maryland. The clinical appearance of the disease in this epidemic was identical with that observed elsewhere, and did not differ from that seen in sporadic cases which have come to our attention. The disease is essentially a recurrent serous uveitis. The onset is characterized by lachrymation, edema of the periorbital fold, slight haziness of the cornea, the occurrence of a gelatinous, mucopurulent exudate in the anterior chamber, and the usual signs of iritis with synechiae and exudations into the vitreous. Exudates in the retina occurred, but were difficult to study on account of the disease of the anterior portions of the uvea.

Filterable Virus Infective

Experiments were designed to solve the problem of whether periodic ophthalmia in horses can be successfully transmitted by means of a filter-passing agent. We believe it has been. The reasons upon which we base our belief are three fold. First, the experimental disease is indistinguishable clinically from the disease as it is observed in nature, not only in the actual appearance of the lesions but in the relapsing course which they pursue. Secondly, the pathological lesions in the experimental disease and in the natural disease are identical. Thirdly, we could find no evidence that bacteria produced these lesions. Aerobic and anaerobic cultures made from eyes in the acute stage of the disease gave uniformly negative results, and sections of such eyes, stained by special methods did not show either bacteria or spirochetes. Furthermore, the infiltration with mononuclear cells, and the almost complete absence of polymorphonuclear cells in the exudates would be unusual in a disease caused by bacteria such as are usually found in pyogenic inflammations. We believe, therefore, these experiments to indicate that this epizootic of periodic ophthalmia in horses was caused by a filterable agent, and that the disease can be transmitted to other animals by the intra-vitreous inoculation of this agent. The successful transmission of the disease to the horse after successive transfers through six series of rabbits indicates that the agent is capable of propagation in this species and belongs to the

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group of filterable viruses. In the main this agent appears to attack the optic nerve, retina, pigment epithelium, and the uveal tract. Whether the involvement of the uveal tract is an extension of the inflammation from the retina and pigment epithelium of the ciliary processes cannot be stated. In rabbits the disease produced by this filterable agent is limited almost entirely to the nervous structures of the eye, while in horses the onset and involvement of the anterior uvea are so sudden and abrupt that it is impossible to tell where the initial lesion starts.

Efforts to Infect Rabbits

It is also by no means certain that the action of this filterable agent is limited solely to the eyes. Two horses and a number of rabbits were autopsied and sections of the viscera studied histologically, but no lesions were found. The brains and spinal cords, however, were not examined in any of the animals. Sections of the optic nerves, both of the horses and rabbits, suggest the possibility that disease of the central nervous system may also occur. None of the horses under observation died from natural causes, but there was a low mortality among the experimental rabbits. It has been noted that horses affected with the disease appear irritable and tend to throw their heads up unduly. Rabbits were observed at regular intervals, but we did not see in them any symptoms of central nervous system involvement. We can, therefore, hazard no opinions as to the possibility, other than that the sections of the eyes suggest that there may have been such involvement. This is a point for future investigation.

Examine for Cell Inclusions

We have not been able to demonstrate inclusion bodies. In a number of sections we have found granules in cells which suggested inclusion bodies, but in no instance could these granules be definitely identified as such. An explanation of our failure to find such bodies may be that they are found chiefly in the early stages of diseases caused by filterable agents; our sections of eyes with the natural disease were all obtained from blind horses in which the disease had reached the end stage. Likewise, our experimental horses were all in the late or healed stages of the disease at the time of autopsy, for in the transmission experiments it was necessary to observe the horses for a long period of time in order to establish the clinical picture of recurrent attacks.

Horses Vary in Susceptibility

Not all horses appear uniformly susceptible to the disease. The morbidity rate in a herd is relatively low. There was a marked variation in the severity of the clinical picture both in the natural disease and in that experimentally induced. While the eyes of a few horses affected with the natural disease eventually healed with little or no final damage to the eyes, the disease usually progressed until there was more or less complete scarring of the eyes with concomitant loss of vision. The comparative mildness of the experimental disease in a few instances may possibly be attributed to a partial natural immunity. The low morbidity of the disease in a herd is in harmony with this conception. Moreover, not all rabbits appear to be susceptible to the experimental disease. A few were encountered which showed no reaction to the intra-vitreous injection of the filterable agent.

Mode of Dissemination Unknown

We have no knowledge of the mode of infection or the natural method of transmission of the disease. Intravenous inoculation of filtrates into four rabbits gave negative results. We cannot state whether or not this filterable agent is similar to any of the other filterable viruses so far studied, or if it constitutes a specific entity in itself. We have as yet made no studies on the possible protective or therapeutic properties of convalescent serum. These are all points for further investigation.

Conclusion

A filterable agent has been obtained from the humors and tissues of the eyes of horses suffering from active periodic ophthalmia. The intra-vitreous injection of this filtrate produced in normal horses the same clinical and pathological picture observed in the natural disease. This filtrate injected into rabbits produced a different clinical picture, but the essential pathological lesions closely resembled those found in horses. After passage of the filterable agent through six generations of rabbits, it again produced the clinical and pathological picture of the natural disease when injected into the eyes of normal horses.

It appears, in this epizootic at least, that this filterable agent was the specific cause of the periodic ophthalmia.

EQUINE PERNICIOUS ANEMIA

Swamp fever in horses has caused serious losses, more particularly in certain localities in the provinces of Manitoba and Saskatchewan, and in the northern part of Alberta.

This is not a scheduled disease as it does not assume epizootic proportions. While it may become prevalent at times, its prevalence is limited to certain localities and it does not spread throughout the country.

It has been definitely determined that the causative organism is a filtrable virus, and it has not been possible to propagate the virus by artificial cultivation, nor to infect laboratory animals.

The viruses have been maintained only by passing them from horse to horse, from infected to healthy horse by inoculation.

It has further been determined that the blood of an infected horse, collected with sterile precaution, retains its virulence in cool storage for an indefinite time, and the blood of horses which have recovered from the disease remains virulent for healthy horses for many years, even up to their natural life.

One of the most important factors, the natural mode of transmission of this infection to horses, is not definitely known. The disease is peculiar to certain districts or localities, and when infected horses are removed to distant premises, where the disease does not naturally occur, it does not readily spread to contact horses. There is consequently reason to believe that some intermediary agent, such as blood-sucking flies, or biting insects may be responsible for the natural transmission of this malady.

It is possible to artificially immunize horses by repeated inoculations of serum and virus, but these horses are similar to the naturally recovered ones, as they remain carriers of infection.

No satisfactory treatment for this disease has been discovered. Much of our research work has been carried on with a view to developing a reliable biological diagnostic test, but no satisfactory method has yet been found.

The only certain method, with our present knowledge, is the inoculation of blood taken from a suspected horse into a healthy one, and this practice is too expensive for general purposes. In the circumstances diagnosis must, as a rule, be based upon clinical manifestations, and there is consequently reason to believe that outbreaks due to other causes producing similar symptoms may be wrongly diagnosed as Swamp fever.—Annual Rept., Vet. Dir. General, Canada.

TO POUR SMALL QUANTITY FROM LARGE BOTTLE

Pouring distilled water or other liquids out of a large bottle into a small receptacle is generally not an accurately gauged operation. Either not enough, or a deluge, but it often has to be done. Get a small lens glass from an old pocket flashlight, and keep it handy. Hold it over the mouth of the large bottle, convexity toward the bottle. You can control the flow through moving the lens with the finger to the required drop. Hold the bit of glass under the tap when you are through, and it is clean in an instant. A simple time and patience saver.

AORTIC RUPTURE IN A MARE COINCIDENT WITH CHOKE

I report this case because to me it seems not only one of the most unusual it has been my experience to observe or read about but one of the most unusual that could occur in any veterinarian's practice.

One Sunday I was called into another man's territory, a distance of 17 miles. The roads were not good and I asked why I should be called into this other veterinarian's territory, and was informed that their regular veterinarian was sick. I was asked to relieve a mare that had been choked on oats about 6:00 P. M. the evening before. The animal had been suffering 18 hours when I saw her.

I found a mare 16 years old, with a colt just a week old. The mare, weighing about 1,200 pounds, was choked to the middle cervical region. She showed the usual troubled facial expression all choked horses show, although she was no longer making those facial and cervical contortions they usually do in the beginning.

The respirations were normal. There was no dyspnea. Her body was dry. Altogether from external appearances she looked no worse than if she had become choked a short time before. However, I realized the gravity of a choke having existed for 18 hours and I gave a guarded prognosis.

A speculum was put on the mare and adjusted. Two men held the mare steady while I passed a stomach tube into the esophagus. It went to the middle region of the neck easily. The mare was just a little restless but no more so than the usual case when the tube is passed. The breathing was just a bit stertorous but there was no real dyspnea.

A small amount of water was injected by an attendant. The men holding the mare for me were instructed to pull the head of the mare down as soon as water or oats would come forward, which they did. A small amount of oats came, but mostly water.

I believe I can safely say that we were working on this mare not ten minutes, injecting water in small amounts, with not the slightest forcing of the tube, everything seemed to be working fine, I felt good, thinking that in just a few minutes the mare would be relieved from choke, when all of a sudden, without any sign or warning, the mare reeled backward and fell over on her right side, dead, with no struggle whatsoever. If a bolt of lightning had come from a clear sky and struck this mare dead while I was working on her, it could not have dumbfounded me any more.

I asked permission to make a postmortem examination, because I could not reconcile any symptoms observed with this sudden death. The client readily consented.

When the left thoracic wall was removed, I noted that the pericardial sack was tensely distended. I cut into the pericardium carefully and about a quart of clotted blood was removed. I was then most careful so as not to destroy any evidence. By palpating I soon found a rupture big enough to freely admit my thumb. I took great pains in removing the heart and adjoining vessels so I might determine exactly where the rupture was. It was in the aorta on the side adjacent to the pulmonary artery deep down in the groove formed by the aorta and the pulmonary artery.

I see no connection between the choke and this rupture unless the anxiety of the mare caused through excitement and undue strain upon the heart and vascular system. The stomach tube as revealed by the postmortem examination had not been introduced farther than the entrance of the thorax. The esophagus was not injured anywhere. The choke of ground oats from the entrance to the thorax to the stomach was uniform and about the size of a summer sausage. It had not interfered with respiration nor circulation, the lungs were normal. If the rupture of the aorta had not killed the mare, the choke would soon have been relieved. Except for the rupture this heart looked as normal as any I have seen. I am still glad I made that postmortem examination. I have never regretted the time and effort expended to make an autopsy. I make autopsies on my fatal cases when there is an opportunity or whenever I can make one.

S. P. Holtz.

West Point, Ia.

An Odontoid Formation Associated with an Open Fontanel

By J. A. HOWARTH, Davis, California
University of California, University Farm

THE FOLLOWING is an interesting instance, in a living male lamb, of a large open fontanel with a tumorous mass that contained an odontoid formation which was attached to the meningeal coverings.

A cross-bred Hampshire lamb two days old, having a large protuberance 7mm in diameter on the head between the ears, was brought to the clinic on February 2, 1931. Palpation of this enlargement revealed a firm object in the center of the growth. The

Fig. 1. Animal showing large protuberance on head between the ears.

animal appeared to be normal in every other way except that it lacked equilibrium; when placed upon its feet it would stagger and fall, but would continually make efforts to get up again. The animal seemed to relish milk and was kept alive for several days for observation; it was then killed and autopsied. After the hide had been removed from the head an open fontanel was found; the brain and meninges did not, however, protrude into the tumor-like mass; and there seemed to be no abnormal inter-cranial pressure. The enlargement was attached directly to the dura-mater; and careful incision of this mass revealed a large odontoid, or tooth-like formation.

This tooth-like structure, when removed, was found to be irregular in shape, with two prongs, the larger being 3.5cm long by 2cm

Fig. 2. The enlargement containing the tooth-like structure was attached directly to the dura-mater.

at its widest point, and 0.5cm at its narrowest dimension. The other prong was 3cm long by 1.5 cm at its widest point and 3mm in its narrowest part. Resting upon the two heads was a section of osseous tissue 2cm long and 1cm wide.

The tissues surrounding the tooth-like structure were made up mostly of white connective tissue infiltrated with a gelatinous exudate.

The sagittal suture in this case was completely closed, and the fontenal was located 1cm posteriorly to the junction of the frontal and parietal bones. The fontanel was

large, the distance from its posterior to its anterior border being 2.5cm, while its maximum width was 2.5 cm. This opening was bounded posteriorly by the occipital bone, laterally by the occipital and parietal bones, and anteriorly by the parietal bones.

Thoracic and abdominal examination revealed no abnormality. Macroscopically the

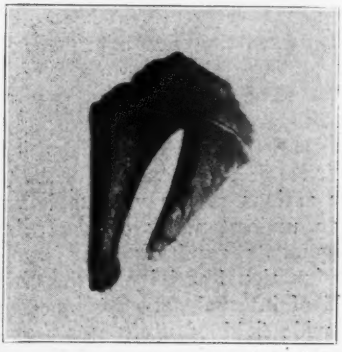

Fig. 3. The odontoid formation after removal from the tumorous-like mass.

osseous structures of the body, with the exception of that portion of the skull previously described, appeared normal.

The literature relative to open fontanels

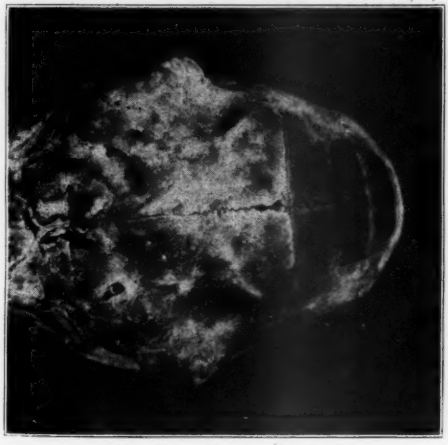

Fig. 4. Skull showing location of the open fontanel.

and osseous structures allied with this condition appears to contain no description of a case where an odontoid formation was associated with this deformity. Small, irregularly shaped pieces of bone called "Wormian-bones" are occasionally found associated with hydrocephalus, but in this case the possibility of the latter condition is improbable because no hypertension of the fontanel nor other signs of hypdrocephalus appeared.

CHOKE IN HORSES*

Oats is a common cause of choke in horses. Ordinarily such choke is easily relieved without an operation. Our plan in such cases is first to place the animal with his front feet in a ditch or in any position where the head is lower than the body. The head should be kept down by tying if necessary.

The stomach tube is passed down to the obstruction and water poured into it until the animal retches, then allowed to return and the process repeated. If the head is kept low there is no danger of the water running into the lungs.

Our alternative is, of course, to incise the skin and pick up the esophagus and ligate it through the tube above the obstruction. But this is rarely necessary. By keeping the animal's head low and with patience and persistence, an obstruction of oats many inches long can be washed out in a short time.

Where there is a diverticulum in the esophagus, a ligation becomes more necessary and may be the only means by which one can relieve such a choke without cutting into the esophagus. This is a method of relieving choke that appeals very much to the owner. He sees something being done and then sees the animal relieved while you are still there. While, on the other hand, if you give the horse a hypodermic injection of arecoline or pilocarpine and go away, while the choke will in many instances be relieved, the owner doesn't like it. He sees his animal still suffering or at least he thinks he is suffering and you have come and gone, and he just doesn't like it. Don't do it. A part of your job is to relieve the anxiety of the owner.

*Notes from an address by T. H. Ferguson, Lake Geneva, Wisconsin, at the Eighth Annual Short Course for Graduate Veterinarians, Alabama Polytechnic Institute, Auburn, February 2-7, 1931.

Glandular Therapy in Veterinary Practice

By H. W. JAKEMAN, Boston, Massachusetts

THE application of glandular therapy in veterinary practice is not receiving the attention which it should. While there may be many apparently good reasons for this the fact remains that if the veterinarian is going to keep pace with the advance of medical science he cannot close his eyes to the results which the practitioner of human medicine is obtaining with endocrines. Many, in fact most of the diseases or complex syndromes which the endocrinologist is successfully treating in humans by the scientific use of glandular products are analogous to those encountered by the veterinarian, especially the small animal practitioner.

Some application of glandular therapy is being made by veterinarians, but it is very limited in the light of present knowledge. When a certain glandular derangement is diagnosed a glandular product is frequently administered without proper consideration of dosage or length of administration and in consequence the desired or expected results are not obtained and the product is discarded.

In the application of glandular products to veterinary practice it should be kept in mind that the glands of internal secretion are inter-related and that a functional disturbance of one gland frequently results in a disturbance in one or more of the other glands. This phenomenon led to the use of combinations of glandular extracts or hormones but it has been scientifically established that only in extremely rare instances is there any indication for or justification in pluriglandular therapy. As a matter of fact a number of years ago this was one of the reasons for glandular products falling into disuse. The combinations of hormones employed were therapeutically incompatible or in other words each inhibited the activity of the other. To correct dysfunction of the glands of internal secretion, treatment should be directed toward the one gland basically at fault.

While some of the conditions in which organo-therapy might be indicated are difficult to diagnose in animals, at least in their early stages, a study of the therapeutic actions of the various hormones and an understanding of the principal derangements resulting from hypo- or hyper-functional activity of the different glands of internal secretion opens up a very wide field of usefulness for these products in veterinary practice.

Many endocrines possess a therapeutic action which they do not exert physiologically or *in vivo*. For example the vasoconstrictor action of epinephrin when applied locally to check hemorrhage is a theapeutic one. Likewise the action of pituitrin in bringing about contraction of the uterus during labor is a therapeutic action. These uses of various endocrines are commonly made by veterinarians. We would like to briefly point out a few of the outstanding applications of glandular therapy in veterinary practice directed toward correcting functional disturbances of the endocrine glands. For the most part these disturbances are in the nature of hypo-functional activity either due to under development of the gland or to excessive strain or requirements being placed upon it.

Within recent times a great deal of light has been thrown on the significance of hypocalcemia. Milk fever is an outstanding example of this in veterinary practice. Eclampsia, rachitis and tetany are other illustrations. It has been definitely established that the parathyroid gland controls calcium metabolism and that when this gland is not functioning

properly or an excessive load has been placed upon it through a too heavy demand for calcium that this condition of hypocalcemia results. The parathyroid gland in addition to controlling calcium metabolism possesses a powerful action in the neutralization of certain metabolic toxins. With these extremely important functions of the parathyroid established, the many and varied applications of parathyroid therapy especially in small animal practice become apparent.

A few of the pathological conditions in which parathyroid medication is indicated are rachitis, osteomalacia, eclampsia, distemper and in the milder cases of paresis and chorea. It is also of value during pregnancy to prevent decalcification of the mother with resultant tendency to eclampsia and also rachitis in the offspring. The dosage in small dogs is 1/10 gr. three or four times daily, but in larger breeds or severe cases the daily dose may be increased to two grains. The dosage should be to effect; there is practically no danger of overdosage unless continued over too long a period of time.

Another group of endocrines which is deserving of more attention in veterinary practice is the pituitary group. The whole gland extract has been used to bring about or strengthen uterine contractions in labor, to bring about expulsion of fetal membranes and also in breeding deficiencies of large animals. In pituitary extracts both the anterior and posterior lobes are included and the actions and functions of these two lobes differ widely. Differential diagnoses with the therapeutic use of the proper portion of the gland is attended with better results. The anterior lobe controls skeletal growth and development of the sex glands. Many cases of sterility attributed to ovarian or testicular dysfunction are doubtless due to anterior pituitary deficiency and may be corrected by the administration of anterior pituitary in doses ranging from 3 to 10 or more grains per day. In the female these cases are usually ones showing irregular or absent estrum with excessive fat and poor bone development. Cases of sterility showing normal estral periods and no pathological condition to account for failure to conceive are usually the result of ovarian dysfunction with scanty or no ovulation. In such animals ovarian residue (ovary without corpus luteum) should be given in 5 to 10 grain doses three times a day.

The posterior lobe of the pituitary gland is used to bring about expulsion of retained placentae. It is also used to stimulate milk secretion in the dog for which purpose a 1/10 grain tablet given every three or four hours is the usual dosage, although this can be increased if necessary. Posterior pituitary has marked curative value in diabetes insipidus and in human medicine it is used to good advantage to overcome surgical shock and gas pains. Doubtless it has a similar application in veterinary practice.

Thyroid preparations are frequently used in small animal practice. Their application has been largely confined to the treatment of clear cut cases of goitre of the type due to thyroid deficiency and accompanied by sluggishness, slow pulse, frequently subnormal temperature and an excessively dry skin. Recently thyroid has come into prominence as a valuable adjunct in the treatment of dry eczemas. The thyroid gland has much to do with regulating the nutrition furnished the skin and in faulty metabolism with hypofunctional activity of the gland excessive dryness of the skin with itching developes. The pruritis of jaundice responds well to thyroid administration. British veterinarians have reported its successful use in the toxemias of chronic infections. The dosage of thyroid ranges from ½ grain to 2 grains three times a day.

Epinephrin in addition to its local vasoconstrictor action is a powerful stimulant to the heart and is therefore valuable in cases of collapse. It also is a preventive against anaphylactic or foreign serum reactions and when administered quickly overcomes these reactions. It is a specific for urticaria and allays the itching of this condition. In hematemesis and also in-

testinal hemorrhage good results are obtained from the administration of ½ dram of the 1 to 1,000 solution given orally with a little water.

Considerable interest has been created by recent articles of a prominent veterinarian of England reporting the excellent results obtained with spleen extract in a number of long standing cases of eczema. These articles also refer to a number of cases of thrush which responded promptly to three or four injections of spleen extract. Attempts to confirm the merits of spleen extract in eczema have met with varying results as might be expected, for there is probably no one preparation which can correct all of the functional organic or metabolic derangements which may be back of a given case of so-called eczema. A few cases of moist eczema which had been very refractory to treatment over a long period responded to injections of spleen extract in such a surprisingly satisfactory manner that it is felt further clinical and experimental evidence should be collected to determine the exact application and merits of this glandular product in eczema. Spleen extract can be given in tablets or capsules or hypodermatically. When the tablets are used a 5 grain tablet three times a day is the usual dosage for a dog. When injected, 2 or 3 cc is given every three or four days for five or more treatments.

That the glands of internal secretion contain extremely powerful substances has long been known. It has likewise been known that these glands are closely inter-related and that a proper balance of activity is essential for health and well being to prevail. Any deviation in the form of either hypo- or hyper-functional activity results in some abnormal condition of the individual and in most instances in far reaching complex symptoms. In view of these proved facts and the rapidly increasing clinical evidence as to the results which follow the administration of glandular products in accordance with the physiological principals they involve, it is apparent that they should be receiving greater consideration by the veterinarian and that more application of recent developments should be made in veterinary practice.

STOCK YARDS FEVER—SHIPPING FEVER ET AL.

I am prompted to write of this particular case because of a letter I received recently from an old friend who made the statement that all of us would-be investigators were on the wrong track with regard to the cause of stock yards fever and allied ailments in cattle.

He stated that he believed that a specific virus as yet undiscovered might be proved to be the causative agent and doubted any definite control or preventive measures possible until this virus is identified.

He may be right and I can understand how such a belief seems real to him, for he further states that he has never accomplished any lasting benefit in any great proportion of his treated cases, either in shipped in or locally raised animals, and that both have the same diseased condition. He admits using everything in the category of recommended biologics, but the fact remains that he has not used the right one, has missed the opportunity to do the thing that many veterinarians do as a regular routine and with results that take all the pain out of that part of their practice.

Doctor Kinsley speaks wisely when he states that the disease manifestations in cases of so-called stock yards fever are just as varied as the bacterial flora, endogenous or exogenous or both, which become active when the host's vitality becomes lowered by any debilitating influence or circumstance, on premises where the animal was born or the newly acquired premises made possible by modern transportation facilities.

The case I have in mind consisted of two carloads of 350-pound calves purchased in the Kansas City Stock Yards and shipped to an Illinois farm. These

calves were an exceptionally fine lot of range Herefords, in good flesh when purchased.

Four or five days after arrival on the farm, several went off feed. Not much attention was given their condition until the 9th or 10th day when the owner discovered two dead ones. In looking over the herd he discovered several that were ill and he called a veterinarian, who in turn called the writer and asked him to go along. When he arrived a third calf was dead and autopsies were held on all, since the cold weather had kept the other dead ones in fairly good shape for observation. Microscopic and cultural findings will be referred to later.

Of the sixty-seven head that remained on their feet, we picked out thirty-four visibly ill with temperatures from 104° to 108° F. Symptoms revealed every type of diseased condition ever described by any one in the elaborations on the subject of stock yards fever. Some were "thumping" as if their next breath would be their last; some with a dry hacking cough and dirty noses; some with a bloody dysentery, others with high temperatures; arched back, hollow eyed, with neither pneumonic or enteric disturbances observable. Several had sore eyes (pink eye) and two were totally blind from keratitis.

Of the three autopsied, one was a septicemic case and the other two were pulmonary (pulmonary edema). The owner remarked that of all the sick cattle he had ever seen, this herd had the greatest variety of diseases.

It was decided to use a bacterin consisting of diphtheroids, pasteurella and colontyphoid groups of streptococci. The first dose was 1½cc; five days later a second dose of 2½cc was administered. Calves that were too ill to offer resistance when first treated had to be placed in a chute for the second treatment.

Not a calf was lost or a new case developed after the first dose. Within ten days the calves were back on full feed, loss in weight was rapidly recovered and the owner has since stated that he has never fed a bunch of calves that have done better in a feed lot than these have since treatment.

Cases like this are not infrequently met with and similar results are possible if "specificity" is just forgotten and treatment is given as warranted or indicated by the symptomatic manifestations. The cultures taken at the time of autopsies referred to proved conclusively that several species of organisms were present, producing a variation of symptoms in accord with the differences in individual resistance or preponderance of certain organisms or groups of organisms in the infected animals.

It is probable that if any specific product such as hemorrhagic septicemia bacterin, aggressin or serum had been administered, it or they would have proved useless.

Galesburg, Ill. E. K. Glover.

HEMATURIA IN A STEER

Subject.—A yearling steer in a herd of some 200 head.

History.—About the first of February, 1930, a yearling steer was noted by the owner to be losing flesh and he went down and died. When a second steer was noted to be ailing an investigation was made.

Symptoms.—This steer was thin and weak but according to the owner he had been in good condition until the last few days. This steer had continued to eat. There was some edema in the dependent tissues, brisket and venter surface of the abdomen.

Necropsy.—Considerable edematous fluid was found beneath the skin on the under side of the body. There was probably a slight excess of fluid in the peritoneal cavity. The gall bladder was slightly enlarged and filled with a thick bile. The spleen appeared to be about normal. The rumen contained numerous boluses of hay. The intestines were practically empty; the kidneys slightly congested.

The bladder contained about a pint of bloody urine. It showed extensive hemorrhage beneath and into the mucosa. There was one area in the bladder that was apparently necrotic.

From the findings, it is evident that hematuria must have persisted for several days; however, the voiding of bloody urine had not been observed. The cause of this condition was not ascertained. No other cases occurred in this herd.

W. Hampton.

Buffalo, Wyo.

ESOPHAGOSTOMIASIS AND HEMORRHAGIC SEPTICEMIA IN STEERS

April 1st, 1928, a Missouri cattle feeder purchased 320, good quality, two-year-old, grade Hereford steers in the Panhandle. They were shipped at once to Missouri. These steers were being full fed on blue grass pasture and were apparently doing fine until July 1st, when two steers were noted to be lame. They knuckled over and walked with difficulty, finally they went down and one of them died. The steer that died was in the pasture and had no shade and as the weather was very hot the heat may have been a factor in this steer's death. On autopsy several hours after death, the only lesion found was general icterus and evidence of esophagostomiasis. The other ate and drank and was in the shade and ultimately recovered.

Finding intestinal parasitism in the steer that died prompted the prescribing of copper and iron sulphate to be given on the feed for about ten days. All the remainder of the steers were apparently doing fine until July 28th, when another steer was found dead and when the herd was carefully inspected six others were found that were not normal. Of these six two were scouring profusely, the discharge was black and contained numerous gas bubbles.

The steer that was dead was autopsied and there was found extensive sero-gelatinous infiltration in the cervical region. This infiltration extended into the pectoral region and showed numerous small hemorrhages. There was some evidence of esophagostomiasis. Laboratory tests of heart blood and also the sero-gelatinous material from the cervical region revealed the presence of bipolar organisms.

From the findings it was assumed that intestinal parasitism was the primary cause of the trouble and that hemorrhagic septicemia was the cause of death of the steer that died on the 28th. It was recommended that the copper and iron sulphate be given for another ten-day period and then withheld for ten days and repeated. In addition it was recommended that all steers be given hemorrhagic septicemia bacterin.

The foregoing was carried out and there was no further loss.

Kansas City, Mo. A. T. Kinsley.

PULMONARY EDEMA

On January 23rd, 1930, I was called to treat a herd of feeder steers that had been injected some ten or twelve days previously with hemorrhagic septicemia bacterin. Several had died and at this time almost all were sick.

Symptoms.—Nasal discharge, head extended, bowel material very loose, temperature 106° to 107° F.

I treated this herd of 57 steers with mixed bacterin bovine, containing diphtheroids. This vaccination cleaned this herd of cattle up in a few days with no more losses. Since this time, I have treated several hundred head of cattle with the diphtheroid bacterins and it does the work. I have had any amount of trouble in feed yards with young cattle that would not respond to the ordinary hemorrhagic septicemia bacterin or any other line of medication. From my observation I think most of our so-called colds and yard fevers in our feed yards in young cattle have a diphtheroid infection, and should be treated as such.

P. Phillipson.

Holbrook, Nebr.

History and the State's Responsibility in the Control of Anaplasmosis in Oklahoma

By C. C. HISEL, Oklahoma City, Oklahoma

ANAPLASMOSIS is caused by a microscopic animal parasite, the *Anaplasma marginale*. The organism gains entrance to the blood, multiplies and invades the red blood cells. All the way from 1% to 50% of the cells are affected, depending on the severity of the attack.

Anaplasmosis made its appearance in Oklahoma about ten years ago, and was first recognized as a specific blood infection by C. C. Nickel of Nowata, who reported his findings to the regulatory authorities in the spring of 1927. Since that time it has been found in nearly every county of the state, but only very limited progress has been made as to primary cause as well as the transmissibility.

The state has a function to perform in the control of all animal disease, more especially those of an infectious nature. It is most unfortunate that not all states have a research department in close connection with the regulatory authorities. This office is fully appreciative and desires to give full credit to the hard work and cooperation of the A. & M. College, and the U. S. Bureau of Animal Industry for and assisting in our investigations; the latter being represented by Dr. Geo. Stiles, Jr., and all of the local force, with Dr. L. J. Allen in charge.

A. & M. College representatives have visited many counties in northeastern Oklahoma for the purpose of obtaining history, laboratory specimens, and for holding postmortem examinations. Experimental animals are being kept at the college for every-day study of this malady with the U. S. Bureau cooperating in most instances.

The loss in cattle as a result of anaplasmosis in 1928 was very heavy, amounting to thousands of dollars in an important range county alone. Until research and laboratory workers come to the rescue of the regulatory authorities, the enforcement body will be handicapped in applying control measures. During the legislative assembly in 1929, the writer brought to its attention the losses to our livestock industry as a result of this rather new disease in our state and requested an appropriation of $10,000.00 for the study of anaplasmosis. However, the request was not complied with and as a result we are looking for help from our A. & M. College. Perhaps many other legislative assemblies in infected states have looked at this question as did the Oklahoma Assembly in 1929, and as a result not much of importance has been accomplished.

Research workers of California should be given much credit for their efforts to date. It is going to be the task of some research worker to find the vector responsible for carrying anaplasmosis. A Bureau of Animal Industry worker in Louisiana has been quoted as saying: "The *Dermacentor sanguinus,* more commonly known as the brown dog tick in Louisiana, is one of the carriers of anaplasmosis in that state." However, that does not apply in Oklahoma, since we do not have this particular tick. Suspicion has long pointed to the *Tabanus atratus* and the *Tabanus lineola* (horse flies) as possible carriers of anaplasmosis in cattle in Oklahoma. Only recently, Dr. L. H. Moe, veterinarian of A. & M. College, with Professor Sanborn have demonstrated that the disease is carried from one animal to another by flies. No doubt

many other varieties of flies may likewise be carriers of this disease.

When we consider that the state and federal governments have jointly investigated and solved the problems of other diseases of similar nature, which have been successfully eradicated, the state's responsibility in the control of anaplasmosis is clear. The state is responsible for the control of infectious animal diseases. In general, anaplasmosis is no exception, since it affects the major meat producing industry of our state and country. It becomes purely an economic question at a time like this. It is most important that the states should interest themselves in disease outbreaks which tend to cause the economic loss already manifested by anaplasmosis in Oklahoma, because if there has ever been a time in the history of this nation that the farmer generally, and the live stock owners in particular needed assistance, it is at the present moment.

The economic losses to our livestock industry must necessarily be held down to the minimum if we are to regain our normal stride with agriculture generally, which is yet the major industry in this nation. The Oklahoma State Board of Agriculture has rendered every assistance to the farmer and breeder of our state in an effort to solve the transmissibility and control of this disease, and have given and recommended in infected herds such recognized treatments as were available. If any reader of this article has anything to offer as to cause, prevention and treatment, the writer will gladly appreciate obtaining such information.

Paralysis due to Tuberculosis of the Cerebral menniges.

CALF DIPHTHERIA*

I have been unable to find anything concerning calf diphtheria in veterinary literature, except a mention in Hutyra and Marek, which does not entirely apply to the cases I have seen.

I have been through an extensive outbreak of this disease in the last six months. It is an ulcerative stomatitis caused by the *B. necrophorus* and is acutely infectious. The primary lesions occur in the mouth and the pharynx and may extend to the nasal cavity and to the lungs. The exudate coagulates and becomes caseous. As usual in *B. necrophorus* infections, there is a profound systemic toxemia, and an entire inappetance. The temperature goes up to 107° F. and the local symptoms sometimes increase in severity with the development of the attack, death often occurring in two to three days.

Cases that live three to five weeks usually recover. Treatment is both local and general. Necrotic tissue should be removed, appropriate antiseptics applied, and general stimulants given the animal. An outbreak of this trouble that occurred in a shipment of 1,600 high-grade Hereford steers and heifers from Texas is typical of its usual occurrence.

These animals were in good condition when received. They were fed partly good grain, and partly salvage grain which was very dirty and full of nails. The first cases that occurred were light and all recovered. One load of two-year-old steers separated only by a fence from a similar load of heifers and drinking from the same tank, was not affected, although a number of cases occurred in the heifer lot.

One symptom is common to all attacks, and that is a wheezy breathing; the wheezing becoming more pronounced with the progress of the disease.

One lesion common to all cases is a necrotic ulcer of the larynx. This presumably is responsible for the wheezing. Micro-

*Notes from a report by W. A. Beard, Greenview, Illinois, at the Twelfth Annual Illinois Veterinary Conference, University of Illinois, Urbana, February 10-12, 1931.

scopic examination shows the presence of *B. necrophorus* in all cases and the bipolar organism in some cases. In no case were lesions found elsewhere than in the larynx, except that in some cases the ulcer had extended from the larynx into the posterior nares and for as far as six to eight inches into the trachea.

The treatment given was inhalations, eucalyptus and thymol three times a day. In this herd of 1,600 animals, about 75 were affected and one-third of those affected died. Two animals that were very severely affected seemed in danger of suffocation and a trachea tube was inserted. I do not think either animal would have lived another 15 minutes but for the tube. They lived about two weeks after the insertion of the tube, and then died.

BLACKLEG OR—?

February 27th, 1931, I was called to treat a herd of cattle. There were 116 in the feed yards, most of them on full feed of corn. Fifty-three head were on a light corn ration with wild hay, cane and some sudan grass. These cattle on full feed of corn had the same hay ration with the exception of a little alfalfa fed at times. The owner told me that all the cattle had been vaccinated with blackleg bacterins and aggressins during the spring and fall of 1930. Eight had died in twelve to fourteen days previous to my call; two died the day I was there. There were four sick with large swellings on the hip and shoulders and one on the forearm. The swellings indicated sweet clover poison, but on autopsy the lesions were not typical for sweet clover poisoning and furthermore they were not fed any sweet clover hay. Two that were improving, the owner stated, had showed lameness for ten or twelve days, and during the first few days were off feed, but at the time I saw them they were eating about as usual.

The entire herd was re-vaccinated with blackleg bacterin. Two of the four that were sick died and the other two are improving and will apparently recover. Laboratory findings in these autopsied showed a possible blackleg infection. The owner was advised to stop feeding the sudan hay, as it was very mouldy. Two weeks later no new cases have shown up. What could bring about a condition of this kind, where some affected die and others recover? Did some have a low degree of immunity and others not?

P. Phillipson.

Holbrook, Nebr.

IF NOT DUMB RABIES—WHAT WAS IT?

November 20, 1930, a 10-month-old bird dog—a cross between an English Pointer and an Irish Setter—was presented to me for treatment. He was a large, well kept, fine looking individual.

The history of this case was as follows: The dog had not eaten for two or three days. Apparently he had difficulty in swallowing, and he had been extremely nervous. The owner had decided that the dog had a bone lodged in his throat and made repeated examinations to search for it.

When the dog was examined, he was showing the following symptoms: Restlessness and uneasiness, refused to be content in any one position; getting up and moving about frequently; showed a desire to investigate all objects in the office and hospital; paralysis of the lower jaw and tongue; drolling considerable saliva; had an anxious expression, dilated pupils and normal temperature.

This animal was placed in a cage for further observation. The same symptoms continued until the morning of Nov. 23rd, when it was noted that the muscles of the jaw were active and he was able to close his mouth. He was given food and water which he consumed without much difficulty. Twelve hours later he was again unable to swallow and the jaws dropped. The following morning, the 24th, the mouth was closed, the jaw muscles were normal, and the dog was

again able to take food and water. At this time there was a careful examination made of the mouth and tongue and there was no evidence of any abnormal condition existing. By this time, the uneasiness and nervousness of the animal had practically subsided. He was appearing practically normal and continued to do so until the morning of November 30th, when he was discharged from the hospital.

I last saw this dog February 27th, 1931, at which time he was apparently healthy and normal.

There was no treatment of any kind administered during this animal's abnormality, nor has there been any medical attention given him since.

This dog was observed by three or four other veterinarians during the period he was confined in my hospital. A diagnosis of dumb rabies was made by all of them.

This experience has confirmed my opinion that we should never be in too much haste in destroying animals that are showing symptoms similar to those of rabies.

P. B. Darlington.

Chanute, Kan.

DEHORNING*

Dehorning is a painful operation, but it is amply justified because of the pain it prevents the animals from inflicting upon one another. There are advantages to dehorning in calfhood. It takes a nicer, smoother pole, but there are disadvantages as well, since the animal that is dehorned when a calf, if inclined to be pugnacious, makes a bunter, and such animals are sometimes considerable of a nuisance in a herd.

On the other hand, the animal that is dehorned at one-and-one-half years of age or older, does not learn to bunt. They miss the object of their attack by about a horn's length.

Dehorning calves, where it is done by the use of caustic, is not a bloody operation, but I do not believe that we can say it is painless. I am inclined to think that the application of caustic, severe enough to destroy the horn, is perhaps about as painful as sawing off the horn.

For dehorning, either the dehorning shears or a saw may be used. If the shears are used, they should be kept sharp. There isn't a very much easier way for the veterinarian to get in bad with the owner, than by using a dull dehorning shears and crushing a horn or two and part of the skull, perhaps. But, whether the dehorning shears or the saw be used, it is essential that the animal be properly confined. This is extremely important. It is also very important that the operation be done quickly. The resistance of the animals and the clamor that they raise is due more to fright than to pain, because the bovine is prone to bear pain somewhat stoically.

In nervous animals, such as many of the high-bred dairy cows, one or two ounces of chloral, administered one-half to one hour before the operation, prevents the fear and dulls the pain. It is a very nice way to do the operation, when one is called upon to dehorn only a few animals, to which the owner attaches a sentimental value.

Of course, dehorning should be done only during cold weather. Only the most urgent reasons can justify the operation during fly time. The animals should be turned out in a lot as fast as they are dehorned, and if the weather is keenly cold, the temperature down to zero, it is all the better, since the hemorrhage stops quicker, and the colder it is, the better it is for the operation.

When the dehorning is all completed the animals should then be examined and any that are still bleeding should receive treatment before the veterinarian leaves the job. It is very unsatisfactory to the owner for the veterinarian to go away and leave a lot of hemorrhage for the owner to worry about. No matter if you don't think it serious the owner fears it may be. One's job is not done till the hemorrhage is stopped. One cannot build or hold a desirable practice by giving the impression of carelessness or indifference. It pays to be interested in one's patients.

If a small ring of hair is taken off all

*Notes from an address by T. H. Ferguson, Lake Geneva, Wisconsin, at the Eighth Annual Short Course for Graduate Veterinarians, Alabama Polytechnic Institute, Auburn, February 2-7, 1931.

around the base of the horn, they will not bleed so persistently as if the horn is cut just down to the hair, but even then in almost any herd of considerable size, there will be one or two or more animals that will bleed for hours and maybe for a day, or longer. Some, of course, bleed to death if they go untreated. A veterinarian cannot consider that he has completed his job of dehorning until hemorrhage is stopped in all the animals. If he does not stop this hemorrhage, the owner will later attempt to do so with soot, cobwebs and anything else the exigency or superstition suggests, with the result that the horn cavity will become infected, discharge for a long time, probably lead to sinus trouble and for all of the bad results, the operation will be blamed. The cobwebs, the soot or whatever has been used will get no blame, but only credit for stopping the hemorrhage.

Arteries at the base of the horn cannot ordinarily be ligated. A much easier and better way of stopping the hemorrhage of such vessels is to drive wooden pegs into the foramina. Matches or shoe pegs or similar plugs can be driven solidly into these apertures from which the blood is issuing, and effectively stop the hemorrhage.

When it is necessary to dehorn in the summer time, it is best to screen off a section of the barn and to keep the animals in there until healing is well under way. In addition to this, fly repellants should be used, because some flies will nearly always get into a screened room and even one can cause a whole lot of trouble by depositing a few dozen or a few hundred eggs in the cavity opened up by dehorning.

When called to treat a case of infection following dehorning, an easy way to empty the sinus is to pour a little water in the opposite ear. The animal will then empty it herself and the same procedure can be used after irrigation.

A contraindication for dehorning or other operations on cattle is a history of their having been fed on sweet clover hay. Some sweet clover hay, when fed to cattle and some other animals, frequently reduces the coagulability of the blood and, as is well known, in bad cases results in spontaneous hemorrhage into the tissues and death of the animal. This is termed sweet clover disease.

Of course, one would not think of dehorning or performing other surgical operations resulting in hemorrhage in a herd so affected, but there are many degrees of involvement between the slight decreased tendency to coagulate on the part of the blood and the stage where spontaneous hemorrhage into the muscles and other tissues occurs, and it is some of these contraindicated conditions that are likely to get us into very embarrassing situations. So, the only safe procedure is to move with caution whenever there is a history of the animals having been on sweet clover hay, and the best way is not to dehorn or castrate such animals until the sweet clover hay has been withdrawn from them and substituted by some other forage for a period of at least three weeks.

Operate on one animal and watch the results is a method sometimes advocated, but it is not so safe because not all animals are equally affected by the tendency to hemorrhage at the same time. Your test animal might just be one of those slightly affected or not affected at all, and in the herd there might be a dozen affected to the extent that blood would drip and drip for days from any wound.

When you do have hemorrhage due to sweet clover disease, there is only one way to stop it, and that is by the use of defibrinated blood. It is necessary, of course, to get blood from animals that have not been fed on sweet clover hay. If only one or two animals are affected, perhaps a neighbor will let you have blood for the purpose, but if a number are affected and there is a packing house anywhere within reach, it is best to go there and get a milk can full of blood and use it freely in the affected animals.

If one were compelled to dehorn or do other operations on a herd of cattle that had been on sweet clover hay, and could not delay the operation until they had been on other feed for three weeks, it might be well to go to the packing house first and get an ample quantity of serum and have it on hand to use if necessity for it became apparent.

Squeezing out grubs is another operation

you don't want to do on animals that have been fed sweet clover hay for a long time. I mention this to illustrate what a minor thing may result in disastrous hemorrhage in such animals. Squeezing corpora lutea from the ovaries is still another.

THE QUESTION OF PASTEURIZED MILK

Pasteurization is a perpetual surprise. We think it settled, but like Banquo's ghost it crops up again and again to plague us. It is the simplest, safest, surest and cheapest life-saving process in the whole realm of preventive medicine, yet it bristles with difficulties and problems. We give so much time and trouble to perfecting the process because pasteurization is so effective and so beneficent.

At first glance it seems the easiest thing in the world to pasteurize milk. All we have to do is to heat it to a certain temperature, hold it there by the watch, and then cool it. It is nothing more or less than an every-day operation in the kitchen, but on a large and precise scale. The housewife has no difficulty in cooking something in a double boiler. In any kitchen, on almost any day, something is allowed to simmer and then cool.

Experience, however, shows that so simple and practical a problem in physics as the exact heating, holding and cooling of a fluid is fraught with perplexing problems. There is no difficulty whatever in heating and cooling a small quantity of milk in a test tube under accurate conditions in a scientific laboratory. The difficulties appear and grow and multiply when we apply the results on a large scale under varying conditions in industry. It is a constant matter of surprise that something that seems so simple and easy should in practice become complex and perplexing. The reasons for this paradox are apparent when we study the causes of the failures, the blunders and the disappointments that have strewn the pathway of this useful process all along the road.

Pasteurizing apparatus and methods have grown up like Topsy. The industry has blundered through with machines and processes as they were designed, manufactured and marketed only to meet with disappointment and unnecessary expense.

Pasteurization is with us to stay. The problem is as much alive today as ever and even more debatable. There is a plentiful lack of understanding concerning the process and its objects. At one time it was difficult to know whether pasteurization was a badge of honor or a mark of disgrace. This period, happily, has passed and dairymen now proclaim pasteurized milk in bold letters, realizing that it is the best insurance for the industry and the best protection for the public. —Milton J. Rosenau, Professor of Preventive Medicine, Harvard Medical School.

SALIVATION IN THE BOVINE*

Salivation is a symptom of a number of different ailments in cattle. In practice, we find it due to: (1) Meningeal involvement; (2) irritation; (3) rabies; (4) foot-and-mouth disease; (5) stomatitis; (6) ulcer on the tongue or cheeks; (7) ranulae; (8) tumor of the hyoid bone; (9) foreign body lodged (a) between the teeth, (b) in the tongue, (c) in the pharynx.

Our job is to determine the cause in the particular case that is presented to us and in this the history is often as helpful or more helpful than the symptoms. For example, in rabies. Early in this condition, there may be only general nervousness and excitement, which is not conclusive, but a history of rabid dogs in the community helps us to reach a conclusion and would justify bringing a cat or a dog suddenly in the presence of the animal to ascertain if the salivation and the excitement is increased. Here again, the history should be taken into consideration. A nervous animal that is not accustomed to dogs and cats will be more excited by these animals than one that is accustomed to them.

The ordinary case of salivation calls for an examination of the mouth and throat. For this, tie up the animal carefully and restrain the head with a nose lead, and use a speculum. We carry a speculum in the car

*Notes from an address by T. H. Ferguson, Lake Geneva, Wisconsin, at the Eighth Annual Short Course for Graduate Veterinarians, Alabama Polytechnic Institute, Auburn, February 2-7, 1931.

all of the time in our practice, and we use it far more for the examination of the mouths of cows and calves than for horses or for any other purpose. A good light is essential to a good examination. The flashlight is the most convenient, but reflected direct sunlight can often be used.

It is our job to make this examination so thorough that when it is over we know what is in the mouth and pharynx. For the examination of the pharynx, the hand must be used and the best way is to use a glove. The hand should be slipped over the tongue back into the pharynx first with the palm down and an examination made of all parts that we can feel. Then the hand should be turned over and the roof of the pharynx palpated. If this is not done, one will often overlook the cause of the trouble.

After eliminating all possibility of a foreign body and of ulcers and being unable to detect any general cause, such as rabies, one arrives by elimination at the conclusion that the trouble is meningeal or in the fourth stomach. If the trouble is in the latter, there is very apt to be vomiting. In this condition empty the rumen so far as possible through the stomach tube, using large quantities of water. An inch and a half garden hose can be passed readily in the cow, by the use of a mouth speculum or gag and this large tube facilitates the removal of the contents of the rumen.

After the contents of the rumen have been removed so far as possible, a large quantity of water should be pumped into it, to which has been added one pound or one-and-one-half pounds of an equal quantity of common salt and sodium sulphate or a gallon of neutral oil. The animal should then be put on a general tonic. The following is useful:

Finely ground limestone, four parts; bone meal, eight parts; ginger, four parts; gentian, four parts; capsicum, one part. Of this mixture, give two to four ounces on the feed three times a day.

If a foreign body is found in the mouth or pharynx, of course, it requires to be removed. Care should be exercised that it is removed entirely. Such objects imbedded into the walls of the mouth and pharynx are sometimes broken off and, when this occurs, the imbedded part may be very difficult to remove; but if the foreign body is not removed completely, the condition will not be overcome.

Ulcer.—In the case of chronic ulcers (they are frequently found at the base of the tongue) take a large, long curette or bone spoon and give it a very thorough curretting. Then paint with pure tincture of iodine and leave with the owner any good wound stimulant, to be used twice daily. A dilute solution of potassium permanganate is useful for this purpose. It should be applied with a metal or hard rubber syringe. If the ulcer doesn't respond to this treatment promptly, the indolent tissues can often be stimulated by the use of the following:

Formalin, 1 ounce; phenol, 2 ounces; water, 16 ounces. The ulcer should be swabbed once or twice daily with a swab dipped in this solution and the excess squeezed out. The owner may or may not be able to administer this treatment, probably will not be. If healing does not occur, the surface of the ulcer should be cauterized. A stick of silver nitrate makes a good cauterizing agent.

Ranulae usually occur under the tongue and are often as large as a lemon. Treatment consists in opening cyst and destroying the sac. This may be brought about by dissecting out the secreting membrane or by opening it, evacuating the contents and packing it with cotton, which has been dipped in a 10 per cent solution of formalin and all of the excess squeezed out. Care must be exercised that the cotton be only moistened when used for this purpose. Otherwise formalin will escape into the saliva and give the animal a sore mouth.

Tumor of the hyoid bone is not common in cattle, but when it occurs the tumor grows rapidly, becomes large, and causes much salivation. One may find the manger where the animal has stood for a few hours containing gallons and gallons of saliva. The tumor requires to be removed. If not malignant, as it seldom is, prompt recovery may be expected. I have removed such tumors that weighed fourteen pounds.

The only difficulty in the operation is control of the hemorrhage from the artery in the hyoid bone. Since the walls of the artery

within the bone cannot be retract to bring about closing by clotting nor cannot be ligated, it is necessary to use pressure to stop the bleeding. This is best accomplished by taking a match or other small piece of wood, sharpening it and driving it down into the foramen.

SIMPLE INDIGESTION IN CATTLE*

The common cause of this condition in cattle is overfeeding or feeding spoiled feed. We are likely to see it following a wet summer when the fodder hasn't been well cured or the hay has been drenched after it is cut and partially dried out. Feed that has been frozen before it is matured is apt to cause it. Frozen millet hay is very often the cause of impaction of the third stomach and irritation of the fourth stomach. But, probably more cases are due to overeating of concentrated feed than to any other one cause. We find it where the old cow has gotten out and eaten up a barrel of grain that has been soaking for the hogs.

This sort of digestive trouble occurs from time the cows are housed in the fall until they are turned out in the spring. It is a housing disease—cattle on pasture are not so affected.

It is necessary to differentiate these types of simple indigestion from the cases of traumatic origin or else we shall lose the latter cases by not operating on them in time. A circumstance that sometimes helps us in this differentiation is the fact that several cases of simple indigestion are likely to occur in a herd at the same time. This indicates, of course, a common cause which is usually to be found in the poor quality of forage being fed or in a history of having overeaten of concentrates.

I recall an instance where a number of cases occurred in a herd at the same time and the owner was sure it could not be due to feed because he was feeding the same kind of feed that the animals had been eating for several weeks. An investigation, however, showed that he had just commenced on a new stack of hay that, though of the same type as the hay he had previously been feeding, was much coarser and more woody.

Simple cases of indigestion in cows are usually fairly easy to handle, requiring only a brisk cathartic followed by a rumen stimulant. The contents of the rumen are usually dry in such cases, because indigestion leads to a discontinuance of rumination, and when rumination stops the rumen is deprived of many gallons of saliva that is ordinarily swallowed daily. It is necessary to pass the stomach tube and pump in several gallons of water, which should be pumped in slowly, and eight to ten gallons may be necessary, and rumen massage to mix the water with the contents of the rumen thoroughly. Then give one-and-one-half pounds of magnesium sulphate and one-half pound of sodium chloride, one ounce of ginger and one dram capsicum, and the next day put the cow on a course of cascara sagrada and nux vomica given in flaxseed gruel three times daily.

Only one dose of cathartic should be recommended. It should be a big dose and it will be sufficient, provided an adequate quantity of water is pumped into the rumen. If the condition has not much improved by the following day—that is, after the contractions of the rumen are re-established at the rate of about two a minute—it is permissible to give eserin and pilocarpin hypodermically. Particularly is this useful if the secretion of saliva has not been re-established.

A better treatment, however, for the ordinary case is probably a large dose of tartar emetic and a couple of quarts of neutral oil. I give no further saline or other cathartic by the mouth. Every year, many animals in this condition are killed by salt poisoning. I think the neutral oil serves a useful purpose in lubricating the contents of the intestines and preventing intussusception.

If, after three or four days, the case is not responding to this line of treatment, we are justified in concluding that it is traumatic in origin and having reached this conclusion, we are not justified in delaying operation for any reason at all. We should do a rumenotomy right away and remove

*Notes from an address by T. H. Ferguson, Lake Geneva, Wisconsin, at the Eighth Annual Short Course for Graduate Veterinarians, Alabama Polytechnic Institute, Auburn, February 2-7, 1931.

any foreign bodies found in the rumen and the reticulum.

Formalin is much to be preferred to any other agent for keeping down fermentation in the rumen. Its use for this purpose is especially vauable in impaction of the third stomach. It is almost equally effective in bloat in horses.

OBSERVATIONS ON ABORTION AND BREEDING DISEASES IN CATTLE*

It is essential that a great deal more work be done to educate dairymen and the breeders of dairy cattle as to the importance of the health of their animals at the time they are bred. Most of this work must be done by the practicing veterinarians. Some of them are not discharging their full responsibilities in this respect at this time. Although regulations of the Illinois Department of Agriculture require that all animals imported into the state must be free from Bang's disease as shown by a negative agglutination test, not one farmer in 100 when buying animals, makes any inquiry into this matter. Veterinarians should impress their clients with the importance of knowing that the animals they purchase are free from this disease.

I know of a herd disbursed recently in this state, in which the owner, a woman, was advised by her veterinarian not to have the agglutination test made before the animals were sold. Her veterinarian told her that what she didn't know wouldn't hurt her. Comment is unnecessary. The test for Bang's disease is harmless and if it does nothing more, it gives the owner additional information about his animals. There is no honest reason for not making it and many reasons for making it.

We sell our animals on a very broad guarantee. They are guaranteed to be free from Bang's disease, to be regular breeders and ordinarily, to be with calf and to deliver a living calf. Frequently when a sale is about made, we find that we cannot make it on this sort of a guarantee because the purchaser does not know whether or not his herd is free from Bang's disease. Obviously we cannot sell pregnant animals into an infected herd and guarantee the delivery of a living calf at full term.

Several years ago I made to this association a ten-year report on a registered herd, the owner of which had played a losing game. During that ten-year period less than 50% of the calves born alive lived to be one year of age. There was no surplus stock to sell and in fact, the herd was not quite able to maintain itself from its own progeny and year after year animals had to be bought from the outside to keep up the number. In 1925 a new policy was adopted for this herd. All the animals were tested for Bang's disease and 14 reactors found. They were not isolated, but were kept in the same barn with non-reactors and to this time no new reactors have developed.

Although several abortions occurred in the non-reactors, careful bacteriological examination failed to demonstrate the presence of the Bang bacillus. By 1928 all reacting animals had been disposed of, and a number of diseased bulls, all negative, had been eliminated.

In 1929, we began with a new herd on a different farm. The new herd went on to ground on which no cattle had been kept for a period of more than one year, and into completely new buildings. The policy was adopted that we would make no additions to this herd except of bulls of known breeding health. We started with 30 animals, and in two years, we had sold 16 and the herd had increased to 42. In that period we had only one abortion. That occurred at eight months term and the placenta was expelled promptly and appeared to be healthy. Notwithstanding the calf was alive and vigorous and undoubtedly would have lived, it was destroyed. In our experience with the old

*Notes from an address by E. D. Comstock, Jr., Manager, Grangemead Farm, St. Charles, Illinois, at the Twelfth Annual Illinois Veterinary Conference, University of Illinois, Urbana, February 10-12, 1931.

herd, we never knew a calf prematurely born to do any good. We kept the cow open ninety days and as she appeared in good health, was bred and conceived at the first service.

In 1929 we got one living calf for every 1.4 services. In 1930 for every 1.8 services. The reason the record was not as good as the previous year, was due to a single old cow that failed to conceive for eight months and then was disposed of because it was believed that she had passed the age at which it would be profitable to keep her.

In 1929 a new bull with a good record and six of his daughters were purchased. They were not taken into the new herd at once, but held for examination and observation. An examination of the bull showed that he was easily capable of destroying a herd. He was sold for bologna. An adjoining farmer that was fully cognizant of the condition, decided he would take a chance on the six daughters of this bull at a price. He tells me that already his loss attributable to these daughters is more than $1,700.

Forty parturitions in our new herd have had an average gestation period of 282 days.

The Bang bacillus is important, of course, and we would not think of maintaining a herd except one free from it, but it isn't responsible for all of the trouble. In a negative herd, there may be many abortions and much sterility. With our old herd, no less than six tried and proved sires brought disaster. Our loss on 76 animals was $27,000. Seventy-five per cent of our abortion and sterility was among the negative animals.

An old experienced veterinarian, Dr. W. L. Williams, once gave me some advice that was pretty good. He said; (1) don't be a trader. Don't deal in cattle; (2) have parturition pens and put the cows about to calve into them; (3) destroy all weak calves and all calves born before their time as soon as you see them; (4) give potent animals time to recover before you rebreed them and the older they are, the more time they should have.

Some individuals will stand a great deal, but you can't handle the average like that. We have one cow 14 years old who has produced 13 healthy calves. She has been bred to three diseased bulls and has suffered from retained afterbirth three times, but she had sufficient vigor to deliver a living healthy calf just the same.

The breeding problems in a small herd are by no means difficult to solve. It is the small herds on a thousand hills that keep the diary industry afloat. Those men seldom buy anything but bulls. They usually survive; it is the large producer more often than not that is forced out of the business.

Veterinarians should be more careful about the possibility of carrying disease from one herd to another. Perhaps the possibility isn't as great as the owner sometimes thinks it is, but the veterinarian should avoid even the appearance of carelessness in this matter. I recently had a veterinarian call at our place. He came direct from a herd that he was testing for tuberculosis and in that herd 56 of the 57 animals reacted. Coming direct from that herd, he tramped up and down my feeding alleys without having cleaned even his shoes, which showed ample evidence that he had been in the other barn. Perhaps there was no danger in it, but it gave me a most uncomfortable feeling, and I will not call that man on to the farm again.

In contrast is our local veterinarian who has struggled along with me all these years first with the badly diseased herd where his fees were well earned and plentiful, and now with a healthy herd where about all he does is draw blood samples, or examine a cow to determine pregnancy. Yet he rejoices with me over the healthy herd and he doesn't regret that loss of fees. Let me add that he carries several pairs of clean rubbers that were thoroughly sterilized before he left his hospital.

Sweet Clover Disease in Farm Livestock*

SWEET clover is an important crop in many sections of the country. It is one of the best of the nitrogen collectors. It is a good producer of humus, and the giant root system is one of the best for penetrating soils. When it decays, it carries humus and air to a considerable depth.

In some sections of the country, for example, North Dakota, sweet clover will produce twice as much pasture as any other crop. It also produces a valuable seed crop. The price of sweet clover seed is not so high now, but I have known crops to produce $90.00 worth of seed alone per acre.

Sweet clover is a valuable hay crop and a valuable silage crop. The unfortunate part about it, is that sweet clover hay and sweet clover silage is sometimes spoiled, and causes disease. Not all spoiled hay or silage produced the disease, but some years there is lots of trouble from it.

Scofield, in 1921, first called attention to the disease resulting from feeding improperly cured sweet clover hay. We had seen the disease before in our country, but had not recognized its relation to sweet clover hay. The condition has never been encountered as a result of feeding any other forage, and it has occurred from feeding all varieties of sweet clover, the white, the yellow, the annual and the biennial. The method of harvesting makes no difference, nor does the method of storing, nor the season it is cut, nor the place of growth, nor the place in the stack. The disease produced by sweet clover is a non-infectious, non-febrile hemorrhagic condition, with a lowered coagubility of the blood.

Sweet clover disease occurs principally in cattle, and is commonest in young cattle. The younger they are, the easier they succumb to the disease. It is seen occasionally in old cattle. The chief losses in cattle occur during the first winter that the calves are fed.

Experimentally, we have produced sweet clover disease in sheep. It usually requires more time to produce it in sheep than it does in cattle, but not always. Not until this fall did we hear of it occurring in sheep on farms. I think the immunity of sheep is due in the main to their care in the selection of feed. I have never encountered a case of sweet clover disease in horses, and yet in the Red River Valley (that is the only hay that most horses have) we tried to produce it experimentally in one horse, but failed. As a field problem, sweet clover disease is a problem of the cattle owner.

Animals do surprisingly well on sweet clover hay. They do well on it as an exclusive diet. We have fed them sweet clover hay as an exclusive diet for seven months, and we have fed rabbits on this exclusively for 18 months, with no trouble in either case; but when the hay is slightly spoiled, there is often a different story.

Symptoms

The owner of beef or dairy cattle may go out in the morning and see some of his young cattle stiff, with a swelling over the rump, or hips, or elsewhere. They may be bleeding slightly from the nostrils, or he may dehorn his young cattle or castrate them, and 85 to 95% of them will bleed to death. The owner cannot tell that anything is the matter with his cattle until the disease appears, and I can't tell it until it occurs. They look good until they start bleeding. Then the temperature falls. You can't tell the disease by the heart action until hemorrhage occurs, or by any other observable symptoms. We have watched them from the very beginning, until they bled to death. When the first clinical symptom is observable, the animal is already bleeding.

The swellings are likely to be encountered over any of the fleshy portions of the body. They look just like the swellings due to

*Notes from an address by A. F. Schalk, Columbus, Ohio, at the Eighth Annual Post-Graduate Short Course for Veterinarians, Michigan State College, East Lansing, January 26-30, 1931.

blackleg, but there is no crackling sound when the hand is passed over the swelling. The tumors may be of different consistency; they may remain liquid for many months, but most of them are firm, feeling jelly-like in consistency; some are even hard.

When the skin is removed, we always find bright red blood, and it becomes brighter on exposure to air, thus differing from the tarry blood in the blackleg swellings. We are liable to find blood patches all over the animals; smaller flecks even below the knees and hocks. The blood may be some depth in the muscles. Forty-eight hours after death, the blood is a deep blue-black. Even then it is markedly different from the tarry dead black to be seen in blackleg tumors.

The hemorrhages may be extensive. Up to 10 or 15 pounds of blood may be found in a single hemorrhage. There is more or less hemorrhage over the parietal peritoneum and on the rumen. Rarely, indeed, is there any hemorrhage on the small intestine. Hemorrhages may occur around the kidneys and over the pericardium. Similar to the finest hemorrhagic septicemia lesions, they can be found anywhere. The endocardium invariably shows hemorrhage in the left chamber. There are no lesions in the lungs, but there are apt to be hemorrhages around the esophagus, and also into the brain. Such cases exhibit apoplectic symptoms, even when the hemorrhages are very small. Hemorrhage occurs in the bone and lymph nodes and into the joints and also into the uterus at the time of parturition.

I have never found it in mucous membranes anywhere, or in the interior of the intestines, nor in the milk tubules.

Changes in the Blood

Blood studies are very interesting. The blood is a little different than anything else that occurs in human or veterinary medicine. Everything about the blood is normal. Every constituent of blood is present in normal quantities except prothrombin. The clotting of blood is a delicate process and not always uniform. You may find the blood clotting in a normal animal in eight or nine minutes in the morning and in the afternoon, with conditions virtually the same, the time of clotting may be only three minutes.

The toxic principles in sweet clover lower the quantity of prothrombin in the blood, and it is lowered more and more as the feeding continues.

The rabbit is a good experimental animal. It can be bled to death by feeding the sweet clover hay, in six or seven days. Less toxic clovers may kill it in 15 days. If the rabbit lives 18 days, the clover is safe to feed cattle. If blood examinations are made daily, it will be found that the prothrombin is lowered several days before the bleeding begins. The shortest period in which hemorrhage has been known to occur in cattle after feeding toxic clover, is 18 days. It has occurred from this, all the way up to 90 days, depending upon the toxicity of the hay.

The prothrombin, however, in a case of toxic specimens, will begin to go down in seven to nine days. It is not difficult to test the coagulability of the blood, with the use of either a test tube or a capillary tube. It is a test that is well worth while, because the onset of sweet clover disease, once the hemorrhage begins, is so rapid and the mortality so high, that it is a real catastrophy to the cattle owner.

The Detection of Dangerous Clover

However, the rabbit furnishes an even simpler test. If there is any reason to suspect the hay, confine a hutch of rabbits by the stack, and whenever the hay is fed cattle, throw a handful of the same hay to the rabbits. The rabbits will bleed to death from one to two weeks before the cattle are affected, and thus will save loss in the latter animal. When it is discovered that the hay is toxic, unless it kills rabbits very quickly, six to seven days, its feeding can be continued when mixed with twice its quantity of good hay. However, if the hay is toxic enough to kill rabbits in nine days, or less, its feeding to cattle should be entirely discontinued. So far as we know, it may be safely fed horses.

Treatment

A number of agents have been tried to prevent the hemorrhage occurring on experimental and other animals fed hay known to

be toxic. Lemon juice, tomato juice, cod liver oil, bone meal and many others have been used, with no effect in the prevention of this disease. Many hemostatic drugs were tried, all to no effect. Tissue extracts were tried and, while a number would coagulate the blood of infected animals in test tubes, they had no effect when given the animal intravenously, or otherwise. When any animal's blood, drawn into a test tube, requires 35 minutes or more to clot, the danger point has been reached. Some animals will begin to have hemorrhages when the clotting time goes above this point, though some will live on until it requires two hours for their blood to clot in the test tube.

We found defibrinated normal cow's blood a very valuable agent in the treatment of this hemorrhage. Normal blood would not prevent hemorrhage when given, even in quantities of two or three gallons, but the same blood, defibrinated, gave marvelous results, even when only 500cc to 1,000cc were used. Animals that were so weak that they could not raise their heads from the floor, and by all experience, one would say could not live another 24 hours, would get up promptly when given a quart of defibrinated blood from a normal animal, and go on to complete recovery when taken off the toxic hay.

Although the technic of this injection may seem complicated and many of our veterinarians were loth to undertake it, it really is a very simple matter, and easily carried out. It only requires two Mason quart jars, four feet of tubing, a funnel and a trocar, or even a 12-gauge needle.

Draw off from the jugular vein of the normal animal, about one-half quart of blood, and start defibrinating. Shake until the defibrination is complete. Strain through three or four thicknesses of cheese cloth into the other jar, and inject immediately into the jugular vein of the sick animal. Keep out air.

We have taken specimens from the injected animal in the opposite jugular vein every minute during the injection. The coagulating power of the blood will be almost back to normal in ten to 12 minutes; but it will not stay there. It falls again, but usually will not go down to the danger point, if the animal is taken off the toxic feed.

Finding a normal blood to use for the injection is often a considerable problem. Obviously, it cannot be taken from animals in the herd, because all animals in the herd will have been fed the same toxic hay. Sometimes it can be obtained from a neighbor's herd. If there is a packing house within 50 miles, the best thing to do is to go there and get four or five gallons of blood, defibrinate it, and use it. It works wonders. I know of nothing else that will give a veterinarian so much prestige.

We have used horse's blood on a few cases—only four. It was toxic in all instances. We have tried preserved serum, and it, too, was toxic. Some of the biological houses are now marketing a serum sterilized by filtering. We have tried it and it is good, but it does not relieve the animals quickly, like the fresh, defibrinated blood. Next to the fresh, defibrinated blood, however, it is the best bet. If you can't possibly defibrinate the blood, whole blood may be used, that has been drawn into potassium oxylate, to prevent clotting. It is not nearly so effective as defibrinated blood, and it produces shock, but it is better than nothing.

One cannot tell by the degree or the kind or extent of spoilage in hay, whether or not it is toxic. But two means remain to prevent loss from this condition. One is to feed rabbits on the same feed, a handful each day, and the rabbit, unlike the daisies, will tell. They will tell at least a week before the cattle are in danger. The other is to make coagulation tests every two or three days. This also will tell. When the blood requires more than 20 minutes to coagulate in a test tube, one should become suspicious. If it requires 30 minutes, it is indicative that the clover hay is toxic. If it requires 35 minutes to clot, the danger point has been reached, and the cattle should be taken off such feed at once.

We have never found this disease as a result of eating sweet clover hay at pasture. One pasture was checked for four consecutive years. During every month of

the time the animals were on this pasture, the operations of castration or dehorning were performed, and at no time was there dangerous hemorrhage from these operations. Blood was drawn from these animals every week during one season, and we never found any evidence of a lowered coagulability of the blood.

Numerous cases have been reported by practitioners of sweet clover disease occurring in cattle on pasture. Usually in such instances the hemorrhages have not occurred spontaneously, but as a result of the operation for castration or dehorning, or some other such operation. I do not believe that the hemorrhage is due to the sweet clover pasture, but rather to eating some of the preceding year's crop, perhaps stubble or old hay left on the ground.

Sweet clover poisoning occasionally results from eating silage. Some of the most toxic sweet clover we have ever found was taken from a silo.

Effects the Fetus

We have never known hemorrhage to occur in any cattle fed toxic sweet clover hay in less than 18 days, but it occurred in one calf only a day old. A hay that should have caused hemorrhage in the cow in 18 days had been fed just 12 days when the calf was born. On the following day the calf died of hemorrhage. In this, the general rule seems to apply, that the younger the animal, the more susceptible it is to this toxin.

The hemorrhages may occur anywhere on the body; that is, anywhere in the voluntary muscles. You find them over the rump, over the shoulder, on the thorax, on the thigh, and sometimes in many places. Frequently when the owner comes to you to tell you about his trouble, he states that he has lost a calf or several calves, and that when he skinned them, they looked as if someone had taken a baseball bat and beaten them all over the body. In fact, in some instances, owners have suspected their neighbors of doing just this. The hemorrhage in the muscular walls of the rumen and showing on the peritoneal surface is easily the most constant lesions in the abdominal cavity.

VIABILITY OF HOG CHOLERA VIRUS IN DIFFERENT MEDIA[20]

During the initial stage of hog cholera, even if fever is present, the urine of the diseased animals is not regularly virulent. Virus containing urine loses its virulency during storage, unfiltered as well as filtered, at temperatures from 17° to 20° C. (64.4° to 68° F.) within two days. In the blood of sick animals, killed by bleeding, the virus resists putrefaction much longer, but finally becomes avirulent also; such blood loses its virulency at a temperature of 20° to 25° C. (68° to 77° F.) after 10 to 15 days' storage. Blood drawn aseptically retained its virulence for 50 days at the same temperature.

Under natural conditions, in the yard or barn, the virus contained in the blood deteriorates considerably quicker; in pig feces at 18° C. within 42 to 90 hours; in garden soil between the seventh to thirteenth day. In putrid organs the hog cholera virus loses its virulency very quickly, so that after 3 to 4 days an infection with filtrates of organ juice is not possible any more.

The virulency of the virus in bone-marrow is more persistent than in the abdominal organs. It has been found as late as 15 days. Drying does not lower the virulency of the virus, but preserves it for months, especially in albuminous media (blood). Drying virulent blood on sterile filter paper is an excellent method of maintaining a strain of virus for experimental purposes. This method deserves special recommendation for the shipping of blood specimens for diagnostic purposes.

The results of these experiments with drying of the hog cholera virus demonstrate plainly the importance of disinfection. The danger from manure is less than was formerly thought. Those parts of the stable which facilitate drying of blood containing virus are the dangerous places. They have to be given special considerations during the disinfection of premises.

[20]David, W. Investigations Concerning the Behavior of Hog-Cholera Virus toward Putrefaction and Drying. *Berl. Tierärztl. Wchnschr.* 479 (1931): 17-23. A test by F. Valkmar.

Reviews and Abstracts

By H. J. MAGENS, Huron, South Dakota

The Tonsils of Swine and Their Relationship to Microorganisms

H. Horn,[1] describes under this heading several interesting findings which should prove of interest both to those engaged in swine practice and those making decisions on ante- and post-mortem inspection of hogs. The function of the tonsils, and the lymphatic system of the laryngeal region, is as yet unsolved to the satisfaction of all. Two views obtain: that they form the major port of entrance for bacteria when food is ingested (milk especially), the other that by virtue of outwardly directed lymphstreams new invaders are carried outwardly again and destroyed (Schlemmer).[2] Both views have many adherents.

Of late claims are advanced that neither are right but that the tonsils and the other lymphatic organs of this region are a closed lymphatic unit (Voss)[3] and have their own secretion. The author claims in keeping with findings in this country that tuberculosis is by far the most frequently encountered lesion in this part of the body and that by far the most important port of entrance for this organism is the oro-pharyngeal and intestinal tract in the hog.

In most cases the epithelium and upper strata of the parenchyma were found intact, connective tissue layers and lower strata of parenchyma were mostly involved. This would indicate that the organisms may very well enter the tonsils without causing very many changes. Only in the deeper layers were pathological changes observed. It must be admitted that most tonsillar cases of tuberculosis are found in animals with generalized tuberculosis, where without doubt the intestinal infection plays an important part as well.

The tonsils may very well become the port of entrance for pathogenic bacteria and in tuberculosis may become a focus from which new infections begin. The part the tonsils play in pyogenic infections is not so clear. Here hematogenous and lymphogenous infections are the rule, the few cases cited show.

With regard to the *Bac. rhusiopathiae suis* Kitt causing swine erysipelas the matter is again somewhat different. The bacillus is ubiquitous, found in many instances in healthy animals. Should they become pathogenic they will develop where they are located at the time and from there begin their attack, mostly hematogenously.

The author does not mention anthrax. We know from experience that the tonsils are the favorite location for these organisms, so much so that the typical symptoms are used in differential diagnosis.

[1] Horn, Dr. H. *Tierärztliche Rundschau.* Die Beziehungen der Tonsillen des Schweines für Mikroorganismen. Nr.20.1930.Nr.2.1931.

[2] Schlemmer, 1923, *veitschr.* für Hals-, Nasen- und Ohrenheilkunde. Bd. 4. H. 4. Die chronische Tonsillitis und ihre Behandlung.

[3] Voss, O. 1929. Zur Physiologie der Tonsillen. *Arch für Ohrenheilkunde.* Band IV.S.1-18.

Two Observations with Regard to Anthrax

Hruska,[4] proved by experiments that anthrax infections are generally located at the place of trauma. Twenty-two kids were administered anthrax organisms orally or by means of stomach tube and by rectal injection. Besides scarification of the skin was practiced on some of them as well as phlebotomy. Not all animals became ill; not one of them showed intestinal anthrax. The infection in all instances was localized at the sites of the artificial traumata. These results force the author to the view that also with regard to the intestinal type of the disease traumata are necessary for its development. Local lesions of some part of the intestinal tract are therefore important.

[4] Hruska, K. 1930. Neue Massnahmen zur Verhinderung des Milzbrandes in verseuchten Ställen. *Münch. Tierärztl. Wochenschrift.* Jg.81.Nr.30.

Since in rumination minute traumata of the intestinal mucosa may occur the author suggests the feeding of soft feeds only for a fortnight in infected herds. No hay or straw should be used as bedding. Simultaneous vaccination should be carried out during this time. The author cites cases where this treatment has been used.

Amanschouloff, S. Arbousoff, P. and Schuravleff, A.[5] offer a rather interesting departure from the normal. They say that for the manufacture of immune sera and anti-sera for anthrax only those animals may be used which are susceptible to the disease by natural infection but which at the same time possess a very high degree of resistance to it and form large quantities of anti-bodies. Horses, sheep and cattle are they say such animals. According to the authors, camels are highly desirable animals in this respect. Due to financial difficulties and other causes they used camels in Uralsk Province. The serum obtained possessed very high immunizing and prophylactic qualities. It is important that this will make the process much cheaper since the camels are more easily kept and give a very much larger amount of serum.

Removal of Foreign Objects from Esophagus in Cattle

The author[6] begins his short discussion with the statement that Hudson's[7] method was used rather accidentally once and that since then it has been practiced intentionally with the best results, that is without ensuing ruptures of the esophagus, which has been observed when probangs were used, in spite of administration of apomorphin or strychnin in horses. After preparation of the surgical field, indicated by location of the foreign object, the skin is incised and the underlying muscle divided in the region of the jugular groove. By manual exploration the esophagus is easily reached and picked up. By grasping around the esophagus the foreign object is then slowly moved upward. No sutures are needed. Intravenous chloral-hydrate narcosis is helpful. Care must be taken against bloating and the trocar promptly applied if necessary.

The author, Rosenthal[8] has treated 15 cases without any ill-effects. Several cases were not operated upon because of already existing penetration of the esophagus.

Treatment of Hemoglobinurea of the Horse with Ephedralin-Merck

The muscular type of this disease is according to Reinhardt[9] the form most often encountered by the veterinarians in practice. He reiterates the well-known fact that the disease always follows several days of rest under exceptionally good feed and care. For an, as yet, unknown cause carbon-acid oversaturates the affected muscles causing an overproduction of lactic acids, the breaking down of which again is responsible for the enormous inflammatory changes in these muscles manifesting themselves in swellings and finally degenerations. Together with the muscular pigments other products of metabolism get into the lymph and blood streams, causing other important changes such as splenic tumors, nephritis and definite changes of the heart. The free hemoglobin unites with that in the blood changing its color as well as causing the urine to become red to dark brown. The carbonic acid must also be held responsible for the stimulus to the heart and perspiration centers, so that excessive perspiration, tremor, etc., are noticed.

Normal functioning of the bladder and bowels is also often interrupted. The author agrees with Araki[10] that phlebotomy only increases the detrimental form-

[5] Amaschouloff, S. Arbousoff, P. and Schuravleff, A. 1930. Die Hyperimmunization der Kamele und die Gewinnung von Milzbrandschutzserum von ihnen. Zeitschrift für Infektionskrankheiten d. Haustiere. Bd.38.1.

[6] Referat. *Tierärztliche Rundschau.* July 13, 1930. Seite 470.

[7] R. Hudson, (1929) "Choking in cattle" *Vet. Journal* Vol.85.Nr.12. Pages 484-5.

[8] Dr. Rosenthal. Friedeberg Nm.2. *Tierärztliche Rundschau.* Nr. 1. Entfernung von Fremdkörpern aus dem Schlunde des Rindes. Jan.4.1931.

[9] Reinhardt, H. Gernsheim a. Rh. Die Behandlung der Hemoglobinurie (Lumbago) des Pferdes mit Ephedralin-Merck *Tierärztliche Rundschau.* 1930 Nov.9.No.45.

[10] Araki, *Zeitschrift der physiologischen Chemie* 1891. 15 Seite 335.

ation of the lactic acids and therefore must be regarded as contra-indicated. The author also thinks that the administration of arecolin and similar drugs is contra-indicated inasmuch as it will increase paresis of the intestines.

His main object is to stop if possible the entering of metabolic substances from the muscles into the blood and lymp-streams.

Prevention is too late since in most cases dyspnea, perspiration, etc., all already indicate the effect of the toxic substances in the system. Absolute quiet is essential. Do not move animal at all. Experiments with adrenalin proved the danger of this drug and the short duration of the contraction of vessels it causes, and showed it to be unreliable, even dangerous. The new drug ephedralin contains a much smaller percentage of adrenalin, its major component being a synthetic preparation ephetonin, the action of which is similar to that of adrenalin but is much more prolonged and not at all drastic. The dangers of the adrenalin therefore are not present in this combination. The dose 3cc may be repeated within an hour if given subcutaneously. It is advisable to repeat the medication even if there is no recurrence of symptoms. Absolute rest is essential.[11] Several drastic cases are quoted all with typical appearances of the disease. Out of these cases there was observed one relapse with a lethal outcome due to the fact that no more treatments after the two initial ones were attempted.

Differential Diagnosis of Verminous Pneumonia and Tuberculosis in Dogs

There exist relatively often in the South of France in dogs Cuillé & Darraspen[12] assert two diseases the differential diagnosis of which, due to numerous points of resemblance in symptoms, is rather difficult. They are: Verminous or as the authors call it cardio-pulmonary strongylosis and tuberculosis of dogs. In a previous essay[13] the authors showed the feasibility of establishing a diagnosis of this condition during life.

Vertigo, epistaxis, muscular fatigue after the least effort, marked edema of the extremities and pains again after muscular efforts should suggest to the examiner strongylosis. In more advanced stages dyspnea, general debility, bronchitis and pneumonia of various types pulmonary emphysema as well as cardiac insufficiency will suggest the same diagnosis. In considering certain localities where the disease is almost enzootic, ascites due to cardiac insufficiency (found mostly in hunting dogs) always points to an infection with *Hemostrongylus vasorum*. The strongyli in embrionic stage may be found in the secretions of the pharyngeal region and the feces. During the winter months from November to January it is often impossible to find the embryos. In examining feces for the strongyli the necessity for keeping the material moist must be stressed. Difficulties in differential diagnosis are greatest during the seasons when the parasites cannot be found either in the pharyngeal secretion or the fecal matter.

To these authors broncho-pulmonary tuberculosis i. e. in an advanced stage, seems to be the most similar condition in symptoms. In certain regions verminous pneumonia is far more frequent than tuberculosis, i. e. of ten suspicious cases brought in for treatment, eight will be affected with the former, two with the latter. The tuberculin test and microscopical examination of the pharyngeal mucous are the most essential helps to a diagnosis. In some rare cases where neither Koch's bacilli nor strongyli in embryonic form could be found, post mortem examination only gave a proper diagnosis.

The authors demonstrated that both conditions may be present simultaneously in a subject. Another means of positively diagnosing tuberculosis is by radiographic examination of the bones.

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[11] Schindler, K. Kremmen. Behandlung der Haemoglobinurie des Pferdes mit Ephedralin-Merck. *Tierärztliche Rundschau.* 1930. Dec.28.Nr.52.

[12] *Revue Vétérinaire et Journal de Médecine Vétérinaire* (Réunis) March 1931. MM. Cuillé et Darraspen, Professeurs à l'Ecole Vét. de Toulouse. Sur le diagnostic de la strongylose cardio-pulmonaire et de la tuberculose chez le chien.

[13] J. Cuillé et E. Darraspen. De la strongylose cardio-pulmonaire du chien. *Revue générale de Médecine Vétérinaire.* 1930. 625-694-753.

THE USE OF NEMBUTAL IN SMALL ANIMAL PRACTICE

The accompanying table gives a record of 47 cases in which I have used Nembutal in dogs intraperitoneally with 100 per cent satisfactory results.

One animal died, but it was a case of strychnine poisoning that was brought to me after considerable delay. I regarded it as hopeless from the first. In two cases where my technic was faulty, no anesthesia resulted and not knowing whether or not it is safe to repeat Nembutal during the same day, I waited a couple of hours and administered ether. The result was satisfactory.

To obtain best results, I regard it as absolutely essential that the animal be thoroughly cleaned out before administering Nembutal. The result of the use of Nembutal on the second cat was most unsatisfactory. The animal remained in a coma for 48 hours and required careful nursing for several days. It was revived

Species or Breed	Wt.	Dose Caps.	Dose Grs.	Time to Complete Anesthesia	Nature of Case	Degree of Anesthesia	Outcome
German Shep.	75	8	12	9 min.	Laparotomy	Complete	Satisfactory
" "	55	7	10½	15 "	Ovariotomy	"	"
" "	45	6	9	21 "	"	"	"
" "	42	6	9	30 "	"	"	"
" "	40	5⅓	8	40 "	"	"	"
" "	37½	5	7½	25 "	"	"	"
" "	37½	5	7½	No effect	"	Used ether later	"
Boston Terr.	7½	1	1½	10 min.	Ovariotomy	Complete	Satisfactory
" "	19	2⅔	4	No effect	"	Adm. same amt. following day	"
" "	17	2⅓	3½	19 min.	"	Complete	"
" "	9	1¼	2	26 "	"	"	"
" "	12	1⅔	2½	6 "	"	"	"
" "	12½	1⅔	2½	13 "	"	"	"
" "	14	2	3	45 "	"	"	"
" "	15	2	3	20 "	Removed 5 fetuses 3 weeks old	Under 9 hours	
" "	19	2⅔	4	faulty tech.	Ovariotomy	Adm. ether next morning	"
" "	11½	1⅔	2½	12 min.	"	Complete	"
" "	15	2	3	20 "	"	"	"
" "	18	2½	3½	18 "	"	"	"
" "	12½	1⅔	2½	11 "	"	"	"
" "	13	1⅔	2½	10 "	"	"	"
Fox-Terrier	25	3½	5 gr.	1 hour	Removed 3 fetuses (Gave addt'l ⅔ capsule after initial dose.	" Very fretful but results	" most satisfactory.)
" "	11	1½	2 gr.	34 min.	Ovariotomy	Complete	Satisfactory
" "	8½	1	1½	15 "	"	"	"
" "	14	2	3	10 "	"	Fretful while under effect	"
Part Boston & Fox-Terr.	13	1⅔	2½	11 "	"	Complete	"
Wire-haired	12	1⅔	2½	14 "	"	"	"
" "	12½	1⅔	2½	25 "	"	"	"
" "	15	2	3	15 "	"	"	"
" "	12	1⅔	2½	faulty technic	"	3 hr. later adm. ether	"
White Poodle	7	1	1½	17 min.	extracted 8 teeth	Complete	"
" "	11	1¼	2¼	20 "	Ovariotomy	"	"
Water Span.	21	2⅔	4	faulty technic	"	2 hr. later adm. ether	"
Springer "	25	3½	5	13 min.	"	Complete	"
Irish Terr.	24	3½	5	8 "	"	"	"
Setter	33	4½	6½	18 "	"	"	"
Frenchie	20	2⅔	4	11 "	"	"	"
Pomeranian	7½	1	1½	14 "	"	"	"
Cocker Span.	17½	2½	3½	13 "	"	"	"
" "	20	2⅔	4	12 "	"	"	"
Mongrel	11	1½	2	25 "	"	"	"
Shep. Pup	18	2½	3½	faulty technic	"	Next A.M. adm. same amt. with good result	"
Brussels Griffon	13	1⅔	2½	20 min.	extracted 4 teeth	"	"
Chow	35	4⅔	7	16 "	Ovariotomy	"	"
Fox-terrier	18	3	4½	8 "	Strychnine Poisoning	"	Died 2 days later in coma
Airdale	60	8	12	22 "	"	"	Recovery next day
Cat	9	1	1½	30 "	Amp. tail at root	"	Satisfactory
Cat	7½	1⅓	2½	30 "	Ovariotomy	"	In coma 2 days—then recovered satisfactorily
Airdale	60	8	12	20 "	Opened leg to wire femur in place	"	Satisfactory

Report of the Canine Clinic and Hospital, Dr. R. H. Kreutzer, Portland, Oregon.
Intraperitoneal use of "Nembutal" in 50 cases from 6-1-31 to 7-13-31.

after 12 hours only by the use of a 0.01 grain of strychnine sulphate hypodermically. It was necessary to repeat this six hours later. Until more experimental work is done in the use of Nembutal in cats, I hesitate to recommend it for this animal.

It is essential, very essential that each animal be weighed carefully on accurate scales, and the proper dosage, (which is one grain to five pounds of live weight), administered. Care must be exercised in these two things, weighing the animal and accurately determining the dose. The rest takes care of itself. I find the following table convenient for reference in computing the dose:

NEMBUTAL

One grain to every 5 lbs. weight
Each capsule contains 1½ grains.

5 pounds	1 grain	⅔ capsule
7½ pounds	1½ grain	1 capsule
10 pounds	2 grain	1⅓ capsule
12½ pounds	2½ grain	1⅔ capsule
15 pounds	3 grain	2 capsule
17½ pounds	3½ grain	2⅓ capsule
20 pounds	4 grain	2⅔ capsule
22½ pounds	4½ grain	3 capsule
25 pounds	5 grain	3⅓ capsule
27½ pounds	5½ grain	3⅔ capsule
30 pounds	6 grain	4 capsule
32½ pounds	6½ grain	4⅓ capsule
35 pounds	7 grain	4⅔ capsule
37½ pounds	7½ grain	5 capsule
40 pounds	8 grain	5⅓ capsule
42½ pounds	8½ grain	5⅔ capsule
45 pounds	9 grain	6 capsule
47½ pounds	9½ grain	6⅓ capsule
50 pounds	10 grain	6⅔ capsule
52½ pounds	10½ grain	7 capsule
55 pounds	11 grain	7⅓ capsule
57½ pounds	11½ grain	7⅔ capsule
60 pounds	12 grain	8 capsule

(I believe 12 grains—8 capsules, plenty for a large dog 60 lbs. or over.)

When we have finished the operation, we return the animal to the kennel, laying it on a wool blanket and placing a hot water bottle at the back and one at the abdomen. Then cover with another blanket. When the animal comes out of the anesthetic, I remove the hot water bottles and an hour later, remove the top blanket. The room must be kept free from drafts.

When the animal is first going under the anesthetic, the respiration often becomes very low. In such cases, use artificial respiration for a few minutes until the danger period is passed and practically normal breathing is resumed.

R. H. Kreutzer.

Portland, Oregon.

ENDOCARDITIS—NEPHRITIS

The patient was a two-year-old, male, German shepherd. He had not been well for two months previous to our examination. He had refused to eat, and had been vomiting a liquid mucoid material for the past two weeks. He drank large quantities of water and urinated very frequently.

He had a temperature of 99° F.; was very weak; and had poor nutrition. The pulse was weak. With the exception of the weakness and thinness, he did not appear sick, and had bright eyes which contained no discharge. These symptoms all were typical of a very chronic condition. Physical examination of the abdomen was negative, and normal soft feces were in the bowel. This dog had had several doses of castor oil, each of which produced purgation.

A urine examination showed the specific gravity to be slightly lower than normal—1012. There was 3.78 grams of albumin in 1000cc of urine. Occasional superficial squamous epithelial cells and frequent leucocytes were found which together with a few granular casts seemed to point to a nephritis and cystitis.

The dog died two days after being brought to the clinic. Postmortem examination revealed a very marked endocarditis in the left atrium, and an endarteritis in the initial part of the pulmonary artery. There was a diffuse nephritis in both kidneys which Doctor Olafson thought might be glomerulonephritis. There was also calcification in and under the parietal pleura on both sides. This was thought to be caused by faulty excretion of inorganic salts by the kidneys, which resulted in the deposit under the pleura. The stomach was congested and contained flat ulcers in the cardiac portion. These ulcers were thought to be terminal or secondary to the other lesions.

D. B. Crane.

Ithaca, N. Y.

EYE WORMS IN A DOG

A few weeks ago a Scotch terrior was brought in for a bath. One eye seemed quite inflamed and an examination revealed several worms about half as long as a common pin and nearly as great in diameter wiggling across the eyeball and disappearing under the membrane nictitans.

The eye was desensitized by instilling into the conjunctival sac a few drops of a cocaine solution and more than 20 worms were removed with the aid of forceps. It was treated with an eye ointment and made a very nice recovery. The other eye was not affected.

This worm was first reported in the vicinity of Los Angeles and was identified by E. W. Price of the Zoological Division of the B. A. I. in 1930 as *Thelazia californiensis*. According to Doctor Price, the life history of worms of the genus Thelazia has not been worked out. However, in view of the fact that related worms require an arthropod intermediate host, it seems reasonable to suppose that this worm also requires an intermediate host and that the dog becomes infected by eating infested arthropods.

Since the probable means of transmission of these worms is by arthropods, strict sanitation of kennels and yards is indicated. Feces, stale food, trash, etc., should be removed from the yard so as to afford as little attraction as possible for probable intermediate hosts.

Wm. E. Ruggles and
J. Karl Leaverton.

Portland, Oregon.

CHECK-LIST OF THE COCCIDIA OF CARNIVORES

Eimeria canis, Wenyon 1923; host; dog; oocysts: 18-45×11-28.

Eimeria felina, Nieschulz 1924; host: lioness; oocysts: 20.7×16.2.

Eimeria mesnili, Rastegaieff 1930; host: bluefox; oocysts: 18×10.8-16.2.

Eimeria novowenyoni, Rastegaieff 1930; host: tiger; oocysts: 14.4-18.

Eimeria sibirica, Yakimoff & Terwinsky 1931; host: marten; oocysts: 24.5×19.45.

Eimeria vulpes, Galli Valerio 1929; host: fox; oocysts: 17×14.

Eimeria hartmanni, Rastegaieff 1930; host: tiger; oocysts: 22.75×14.4.

Lucetina bigemina, Stiles 1891; host: dog; sporocysts: 12-17×7-10.

Lucetina canivelocis. Weidman 1915; host: swift fox; oocysts: 21-16.8× 38.4-28.8.

Lucetina cati, Railliet & Lucet 1891; host: cat; sporocysts: 8-11.5×7-9.

Lucetina felis, Wenyon 1923; host: cat; oocysts: 35-45×23-35.

Lucetina laidlawi, Hoare 1927; host: African fitch; oocysts: 34×29.

Lucetina putorii, Railliet & Lucet 1891; host: polecat; sporocysts: 8-12×6-8.

Lucetina rivolta, Grassi 1879; host: cat; oocysts: 20-25×15-20.

Lucetina viverrae, Adler 1924; host: civet; oocysts: 23×19.

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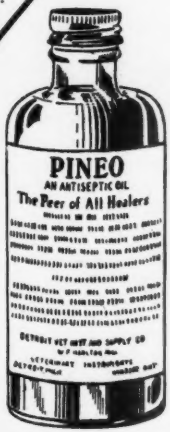

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IT is a gloomy moment in history. Not for many years . . . not in the lifetime of most men who read this paper . . . has there been so much grave and deep apprehension; never has the future seemed so incalculable as at this time. In our own country there is universal commercial prostration and panic, and thousands of our poorest fellow citizens are turned out against the approaching winter without employment, and without the prospect of it.

In France, the political caldron seethes and bubbles with uncertainty; Russia hangs, as usual, like a cloud, dark and silent upon the horizon of Europe; while all the energies, resources and influences of the British Empire are sorely tried, and are yet to be tried more sorely, in coping with the vast and deadly Indian insurrection, and its disturbed relations in China.

It is a solemn moment, and no man can feel an indifference (which, happily, no man pretends to feel) in the issue of events.

Of our own troubles no man can see the end. They are, fortunately, as yet mainly commercial; and if we are only to lose money, and by painful poverty to be taught wisdom . . . the wisdom of honor, of faith, of sympathy and of charity . . . no man need seriously to despair. And yet the very haste to be rich, which is the occasion of this widespread calamity, has also tended to destroy the moral forces with which we are to resist and subdue the calamity.

Good friends . . . let our conduct prove that the call comes to men who have large hearts, however narrowed their homes may be; who have open hands, however empty their purses. In time of peril we have nothing but manhood, strong in its faith in God, to rely upon; and whoever shows himself truly a God-fearing man now, by helping wherever and however he can, will be as blessed and beloved as a great light in darkness.

●

Now comes the remarkable fact. What you have just read was not written yesterday, about the conditions of today . . . *but is a verbatim reprint of an editorial which appeared in Harper's Weekly on October 10, 1857.*

"Of our own troubles no man can see the end." They said it in 1857, and it has been said many times, before and since. Depressions have occured in American business since the Revolutionary War, and every one has looked black, and seemed unending.

Every one has been followed by recovery . . and prosperity.

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* Acknowledgements to Mercantile-Commerce Bank and Trust Company, St. Louis, Mo.

ARMY VETERINARY SERVICE

Regular Army

Major Paul R. King is assigned to duty at Jefferson Barracks, Mo., upon completion of his present tour of foreign service.

Major John H. Kintner is assigned to Randolph Field, Texas, upon completion of his present tour of foreign service.

Major Howard M. Savage is relieved from his present assignment and duties at New York general depot, Brooklyn, N. Y., effective in time for him to proceed to New York City and sail on or about January 13, 1932, via Government transportation for the Philippine Department.

Major Will C. Griffin is relieved from assignment and duty at Fort Brown, Texas, effective in time for him to proceed to San Francisco, Calif., and sail on transport scheduled to leave that port on or about February 4, 1932, for the Philippine Department.

Major Raymond Randall is relieved from further assignment and duty at the Army Medical School, Army Medical Center, Washington, D. C., effective in time for him to proceed to New York City and sail on or about January 13, 1932, via Government transportation for the Philippine Department. Upon arrival at Manila, Major Randall will report to the commanding general for assignment to duty as a member of the United States Army Medical Department Research Board.

Major Isaac O. Gladish is relieved from further assignment and duty at Fort Omaha, Nebr., attending veterinarian at Fort Crook, Nebr., and additional duty at headquarters 7th Corps Area, effective upon the expiration of his present leave of absence, and will proceed to Fort Bragg, N. C., for duty.

Major William R. Wolfe is relieved from duty at the purchasing and breeding headquarters, Colorado Springs, Colo., effective on or about February 1, 1932, and will proceed to Fort Francis E. Warren, Wyo., for duty.

Captain Harry L. Watson is relieved from duty at Fort Francis E. Warren, Wyo., effective on or about February 1, 1932, and will proceed to Colorado Springs, Colo., for duty at the purchasing and breeding headquarters.

The retirement of Colonel William G. Turner from active service on October 31, 1931, because of disability, is announced.

Veterinary Reserve

New acceptances: Ericson, Eric Oscar, Capt., 5127 Dodge St., Duluth, Minn.

Romberger, Earl Ellsworth, Capt., 340 N. 6th St., Reading, Pa.

McCreary, Virgil Dudley, 2nd Lt., Brewton, Ala.

Olson, Carl Jr., 2nd Lt., Mayo Foundation, Rochester, Minn.

Wills, Marion Hudson, 2nd Lt., R. R. No. 8, Paris, Ill.

Promotions: Parsons, Ralph Allen, to Major, 203 Federal Bldg., Olympia, Wash.

Massinger, Charles Eber, to 1st Lt., 805 Main St., Phoenixville, Pa.

EASTERN STATES LABORATORY WORKERS' CONFERENCE

The Fourth Annual Conference of the Poultry Disease Laboratory Workers was held at the Department of Veterinary Science, Massachusetts State College, Amherst, Mass., May 4, 5, 6, and 7, 1931. Twenty-eight members were in attendance, representing the following states and Canadian provinces: Connecticut, Delaware, Maine, Maryland, Massachusetts, North Carolina, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, and the Provinces of Ontario, Ottawa, and Quebec, Canada.

The objective of the conference is to establish more uniform methods employed in pullorum disease diagnosis and eradication and to investigate those problems which are encountered in the diagnosis and eradication work.

The different members contributed data bearing upon the following subjects: (1) antigen (media, age limits, hydrogen-ion concentration, comparison of antigens and strains selected); (2) temperature and length of incubation period for agglutination; (3) hemolyzed samples; (4) "jelled" samples; (5) diagnostic dilution; (6) earliest age of birds for testing; (7) short interval testing; (8) necropsy service as a follow-up measure in doubtful flocks; (9) soil infection; (10) fowl other than chickens; (11) whole blood test; (12) portmortem technique; and (13) comparative readings.

The report by the committee on standard methods of diagnosis was unanimously approved by the conference.

Summary of 1930-1931 Testing Data Submitted by the Laboratories

Laboratory	Samples Tested	Pct. of Infection	No. of Flocks	No. Positive
Connecticut	161,734	1.45	178	55
Cornell	46,420	8.22	97	85
Delaware	89,409	7.92	328	299
Farmingdale, L. I.	11,748	3.16	18	14
Maine	117,046	0.42	239	35
Maryland	16,297	17.13	30	30
Massachusetts	402,983	1.47	447	119
New Hampshire	164,510	0.92	172	36
Ontario Agric. and Vet. Colleges	112,635	5.13	399	329
Pennsylvania	238,229	6.69	434	384
Rhode Island	20,887	5.24	33	31
Vermont	27,584	0.93	72	24
Virginia	135,282	11.41	607	559
West Virginia	38,000	9.16	290	207

Included also in the program were (1) Recent Findings in Coccidiosis of Chickens—Dr. E. E. Tyzzer and Dr. E. Elizabeth Jones, Harvard Medical School; (2) Fowl Paralysis—Dr. C. L. Martin, University of New Hampshire, and Dr. Oskar Seifried, Rockefeller Institute for Medical Research; (3) Infectious Laryngotracheitis—Dr. J. R. Beach, University of California, (on leave of absence at Rockefeller Institute), Dr. Oskar Seifried, and Dr. Charles S. Gibbs, Massachusetts Agr. Exp. Sta.

Correspondence relative to the 1932 meeting, which will be held at Cornell University, should be addressed to Dr. E. L. Brunett, Ithaca, N. Y.

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The next annual meeting of the Oklahoma Veterinary Medical Association will be held in the Skirvin Hotel, Oklahoma City, Oklahoma, January 18-19, 1932.—C. H. Fauks, Secretary.

Up to the present time twelve counties in New York State have been declared "modified accredited." Steuben County obtained this distinction on January 4, 1926. From January 1st to September 30th, 1931, eight accredited veterinarians in the county retested 2,630 accredited herds made up of 27,848 cattle; 102 reactors were revealed on 51 premises, or approximately .4 of 1%.

The State Veterinary Medical Association of Texas met in conjunction with the Ninth Short Course for Graduate Veterinarians at the Texas A. & M. College, College Station, Texas, June 1-5, 1931, this being the 21st annual meeting of the Association. It had one of the largest attendance on record. Also, one of the best programs ever arranged, every hour of the day and evening of the five days being taken up with demonstrations, clinics and papers.

The meeting was opened with an address of welcome by Dean Mark Francis, School of Veterinary Medicine. After Doctor Francis' address came an introduction by R. P. Marsteller of distinguished visitors, all of whom contributed to the program during the five-day

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session, including C. A. Cary, Dean of Veterinary Medicine, Alabama Polytechnic Institute; J. W. Connaway, Professor of Veterinary Science, University of Missouri; Benjamin Schwartz, Senior Zoologist, Bureau of Animal Industry; Harry Kingman, Professor of Veterinary Surgery, Colorado Agricultural College; L. A. Merillat, Chicago; Dudley Jackson, Physician and Surgeon, San Antonio, Texas; Charles E. Salsbery, Kansas City, Missouri; Ashe Lockhart, Kansas City, Missouri; H. M. O'Rear, Division Tuberculosis Eradication, U. S. Department of Agriculture.

The Ladies' Auxiliary also met for their Tenth Annual meeting. The following officers were elected: Mrs. Pearce Leonard, president; Mrs. H. O. Von Rosenberg, first vice president; Mrs. J. S. Grove, second vice president; Mrs. U. E. Marney, San Antonio, secretary-treasurer; Mrs. J. M. Farrell, Wichita Falls, corresponding secretary.

The next meeting will be held in Dallas.

Henry E. Pine, assistant veterinary inspector in the Field Inspection Division of the Bureau of Animal Industry, died on September 3, 1931 at his home in Tempe, Arizona. Doctor Pine is survived by his widow, one son and one daughter.

S. H. Burgess was transferred on September 1st from bovine tuberculosis eradication work to avian tuberculosis eradication work with headquarters at Austin, Minnesota.

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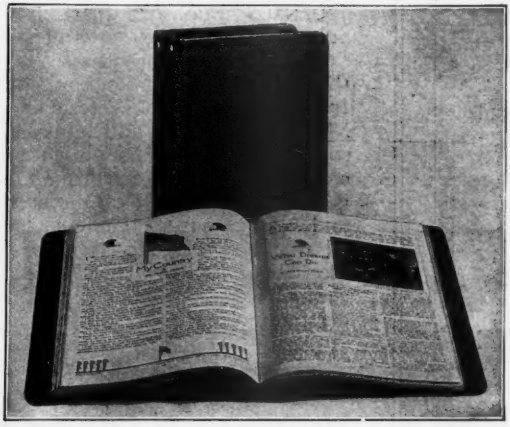

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Malcomb C. Baker, of Montreal, Quebec, one of the most prominent veterinarians in that section of the country, died at his home on October 27, 1931, at the age of 81. Doctor Baker has been prominent in educational circles for a number of years, having been for 25 years president of the Board of Governors of the College of Veterinary Surgeons of the Province of Quebec, and professor of anatomy in McGill University for a few years. Prior to his death, he was associated with his son, Dr. Charles B. Baker, in the practice of veterinary medicine in Montreal.

Doctor Baker is survived by his widow, four sons and three daughters.

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26, Wallaja Road, Mount Road, Madras, South India.

W. A. Savage, assistant veterinarian in the Field Inspection Division of the Bureau of Animal Industry, died suddenly while on duty in the field at Tucumcari, New Mexico. Doctor Savage is survived by his widow and one daughter.

CAESAREAN SECTION

Police Bitch 4 Years Old; Weight, 85 Lbs. In Labor 18 to 24 Hours; Operated on One Hour After Arrival at the Hospital, Seven Live Puppies Were Removed, Mother and Puppies Are Living. Cecil French Technique. Only Six Puppies Are Shown in the Illustration, as One Was Sold Before This Picture Was Taken Which Was Six Weeks After the Operation.—W. F. Hall, Anadarko, Okla.

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The Western New York Veterinary Medical Association will hold its seventeenth annual meeting, December 17, 1931, at Buffalo, New York. For full particulars, write the secretary, Dr. F. F. Fehr, Buffalo.

OKLAHOMA VETERINARY MEETING

The 17th Semi-annual Meeting of the Oklahoma Veterinary Medical Association in conjunction with the Second Annual Short-Course for graduate veterinarians, was held at the Oklahoma A. & M. College, Stillwater, Okla., June 15-17 inclusive.

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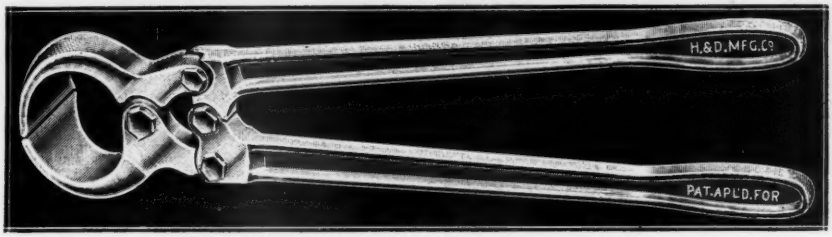

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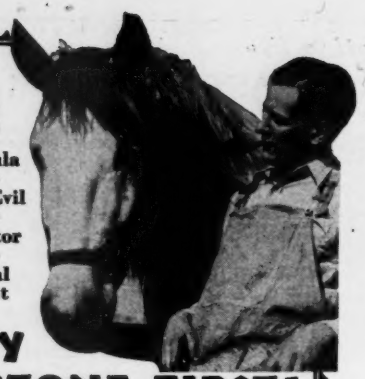

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following subjects: Animal Nutrition, Feeds and Feeding, Internal Parasites, including laboratory diagnosis, Diseases of Poultry, Treatment of Bovine Digestive Disturbances, Livestock Judging, Poisonous Plants Found in the Southwest, Diseases of Sheep, and Problems of Large Animal Practice.

One afternoon was devoted to a small animal clinic. Dr. E. J. Frick assisted by Drs. H. W. Ayers, W. C. McConnell and J. E. McPherson, gave an instructive demonstration of the proper methods of handling, examination and restraint of the dog and other pet animals. A number of interesting cases were presented at the clinic, and the use of Nembutal as an anesthetic was demonstrated. Doctor Frick also gave a very successful demonstration of epidural anesthesia, explaining the technique and the indications for its use.

A short business session for the transaction of Association business was held on the evening of June 15. Among other business disposed of was the question of affiliation with the A. V. M. A. Resolutions were passed accepting in principle the plan of affiliation proposed by the A. V. M. A. Committee.

The association is to be congratulated on the interest and fine spirit of cooperation which the college is displaying in the short course idea. Under present plans, reasonable assurance is given that the annual short course for Oklahoma veterinarians will be definitely and permanently established among the curricula of the A. & M. College.

C. H. Fauks, Secretary.

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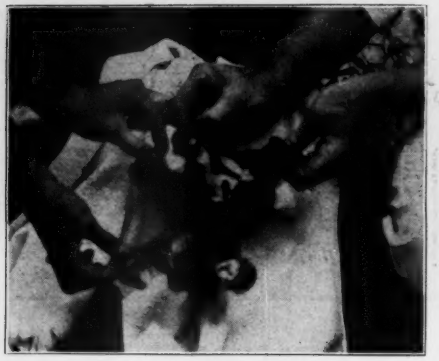

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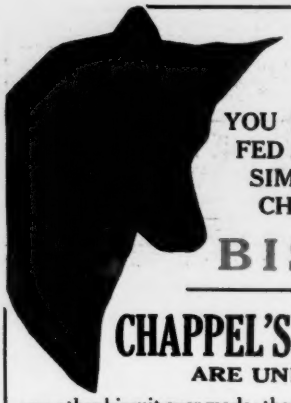

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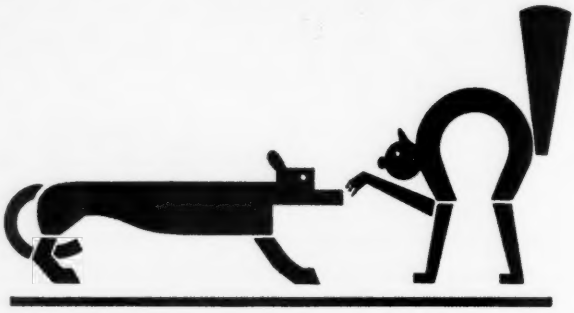

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